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Design of the Steel Framework for an Office Building

Civil Engineering

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DESIGN OF THE STEEL FRAMEWORK FOR AN OFFICE BUILDING

BY

EMMET JOSEPH HEALY
HAROLD PETERSON

THESIS

FOR

DEGREE OF BACHELOR OF SCIENCE

IN

CIVIL ENGINEERING

COLLEGE OF ENGINEERING

UNIVERSITY OF ILLINOIS

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UNIVERSITY OF ILLINOIS

College of Engineering

May 24, 1913.

I recommend that the thesis prepared under my supervision by EMMET JOSEPH HEALY and HAROLD PETERSON entitled Design of the Steel Framework for an Office Building be approved as fulfilling this part of the requirements for the degree of Bachelor of Science in Civil Engineering.

C.W. Malcolm

Asst. Professor of Structural Eng'g.

Recommendation approved

Ira O. Baker.

Head of Department of
Civil Engineering.

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INTRODUCTION

In actual practice the architect furnishes architectural details to the engineer, who then designs the steel framework to conform to these details. As such a procedure was impractical in this design, it was necessary to make some general assumptions as to the architectural features. The limited available data on the subject of steel building construction make it very difficult for the beginner to form definite ideas in regard to the subject. Recourse was had to Freitag's "Architectural Engineering" and Birkmire's "Steel Skeleton Building Construction",but even these books were found to be of little value, and for the bulk of useful and instructive information the writers are indebted to the professor in charge of this thesis.

The writers chose to design an office building, because it probably offers as great a variety of problems as any other type, and,furthermore,it is more often built. The design for this thesis is for a building, 97 feet by 94 feet, having a height of 200 feet from the ground floor to the roof, and it is made in accordance with the Building Code of New York City. On several floors part of the framing was omitted to furnish high ceilings for dining rooms and ball-rooms. This arrangement gave variety to the column design, and where columns were not extended through these rooms the design of girders was required to support the upper sections of these columns.

GENERAL DESCRIPTION OF THE BUILDING

Having determined upon the type, location, and exterior dimensions of the building, it was then necessary to decide upon the column spacing, story height, floor plans, and position of the light court, which would best meet the requirements of a typical office building. The spacing of the columns and the position of the light court, which is shown on the typical floor plan (see page 17), were selected after considerable study, because they gave a maximum amount of office space,together with easy accessibility.

It is the general practice in tall buildings to make the height of the first story somewhat greater than that of the upper ones. For this building 16 feet was chosen as the height of the ground story, and the second story was made 14 feet to give a pleasing transition to the regular story height of 12 feet (see page 16). The seventh story was made 14 feet in height, as it was used for the pipe loft. In order to have the greatest amount of floor space where it was most valuable- on the first two floors - the light court was made to start at the third floor (see page 21). The arrangement and the sizes of the windows are shown on the different elevations (see pages 11-16). The floor plans herein included show all variations from the typical floor, but do not show the arrangement of the partitions, as it was assumed that these would be arranged to suit the tenants. In the east portion of the building is located a grill-room, 72 feet by 36 feet, which extends from the first to the third floor and has a 7- foot hanging balcony (see pages 19-21). A private banquet-hall, 54 feet by 39 feet, is located in the west wing and extends from the eighth to the tenth floor (see pages 22-24). On the fifteenth floor, extend-

ing to the roof, is a ball-room, 92 feet by 39 feet. This room has a 6- foot hanging balcony. Just off of the ball-room there is a reception room, 38 feet by 20 feet (see pages 26-27). The columns extend through the grill-room but not through the banquet-hall or ball-room. To carry the columns over the banquet-hall required heavy girders at the tenth floor (see page 24). The complete computations for one of these girders is shown on page 7. Light plate girders were required to carry the roof over the ball-room (see page28).

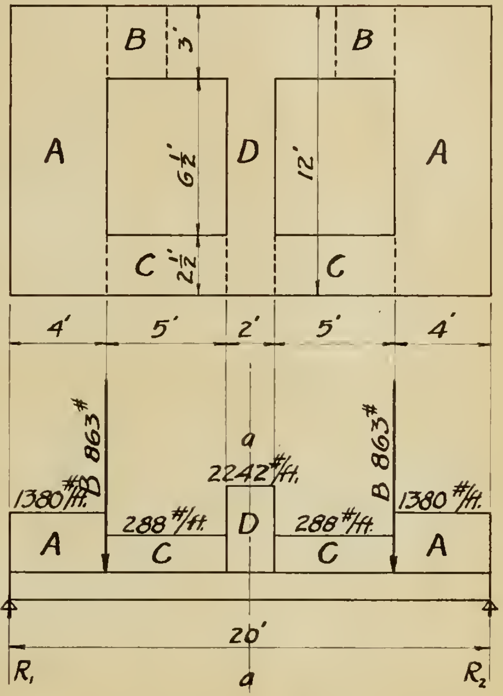
The live loads for the various floors were taken directly from the specifications, but the dead load was computed to be 100 pounds per square foot, with the exception of the roof, eighth, and first floors, where it was estimated at 50, 125, and 150 pounds per square foot, respectively. In making the calculations a 4-inch reinforced-cinder-concrete slab was used for all the floors except the first floor and the roof. This thickness was increased to 6 inches for the ground floor, while the roof-slab was made 5 inches thick. The dead load includes, besides the concrete slab, the weight of the steel, the flooring, and the partitions. The weight of the partitions was estimated at 35 pounds per square foot of floor space. Both dead and live loads are indicated on all floor-plans. For each passenger elevator 55000 pounds and for the freight elevator 65000 pounds were assumed as the loads acting at the centers of the shiv beams. In the determination of the elevator column-loads the impact coefficient was taken as 100 per cent at the top story and reduced 25 per cent for each lower story, thus making zero impact for the fifth story below the top. In proportioning the column-loads the live loads were reduced 5 per cent for each floor until a 50 per cent reduction was reached. Below this no further reduction was made. The full

live load was taken for the roof, top floor, and ground floor. Two typical column-load sheets are shown, one for an interior and one for a wall-column (see pages 31-32). To have included the sheets for every column would have involved too much labor, without a proportional advantage, as all necessary column data are included in the column schedules shown on pages 33-44 , where all loads and sections are given. The computations involved in the design of the various floorbeams, girders, and spandrel-beams are too bulky to be included in this thesis. A typical set of computations is therefore given for each general case, which will suffice to indicate the methods used in the design.

TYPICAL COMPUTATIONS

Outer Spandrel-Beams

From 1st. to 7th. floor, outer spandrels carry 12ins. of wall. Distribution of wall loads over spandrels will be assumed as shown in sketch.



Wt. of masonry = 115 lb. per cu. ft.

3 x 2.5 x 115 = 863 lb.

5 x 3 x 115 = 1725 lb.
12 x 2 x 115 = 2760 lb.
Total 4485 lb.
= 2242 lb. per ft.

2.5 x 115 = 288 lb. per ft.

12 x 115 = 1380 lb. per ft.

R_1 = 1/20 (1380 x 8 x 10 + 1726 x 10 + 288 x 10 x 10 + 2242 x 2 x 10) = 10065 lb.

M at section a-a = 10065 x 10 -1380 x 4 x 8 - 863 x 6 - 288 x 5 x 3.5 - 2242 x 0.5 = 44936 lb. ft. = 539230 lb. ins.

Required I/c = 539230 ÷ 16000 = 33.7

Use 12" I 31.5#

Girders to Support Grill-Room Balcony

Floor load = 175 lb. per sq. ft.

Span of girder = 18 ft.

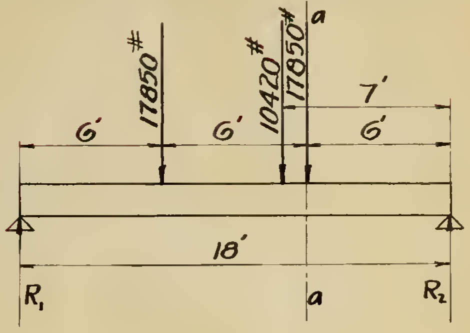
Floorbeam reaction at girder = 6 x 17 x 175 = 17850 lb.

Balcony hanger reaction = 7 x 17 x 175 x 0.5 = 10420 lb.

Moment about R_1 = 2 x 17850 x 9 - 10420 x 11 - $18R_2$ = 0

R_2 = 24220 lb.

Bending moment at section a-a = 6 x 12 x 24220 = 1744000 lb. ins.

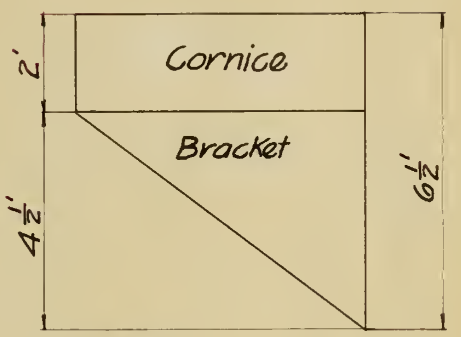


Required I/c = 1744000 ÷ 16000

= 109

Use 2 - 15" Is 42#

Cornice Beams



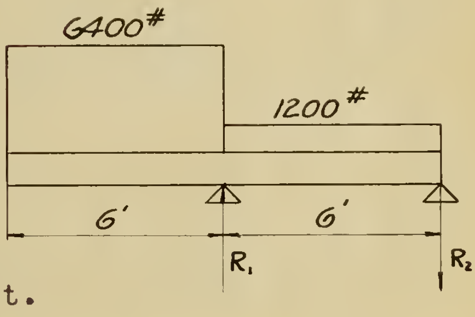
Wt. of tile = 60 lb. per cu. ft.

6 x 2 x 1 x 60 = 720 lb.

per lineal ft.

Consider brackets placed every 4 ft.

3 x 4.5 x 60 ÷ 4 = 203 lb. per lineal ft.



Approximate wt. of steel:

2 - 8"[11 1/4 # = 23 lb.
1 - 10"[20# = 20 lb.
3 - 4"x 4" x 3/8" Ls = 30 lb.
1 - 12" I 40# = 10 lb.
Total 83 lb. per ft.

Assume 4 - in. reinforced-concrete slab over cornice.

Wt. of slab per lineal ft. = 6 x 0.33 x 150 = 300 lb.

Total dead load of cornice per lineal ft. = 720 + 203 + 83 + 300 = 1306 lb.

Use 1300 lb. as weight of cornice per lineal ft.

Condition giving maximum moment in cornice beams is dead and live loads on cornice and dead load on roof.

Dead load on cornice = 1300 lb. per ft.

Dead load on roof = 50 lb. per sq. ft.

Live load on roof and cornice = 50 lb. per sq. ft.

Assume beam to carry 4 ft. of cornice.

Roof dead load = 50 x 4 x 6 = 1200 lb.

Cornice dead load = 4 x 1300= 5200 lb.
Cornice live load = 50 x 4 x 6 = 1200 lb.
Total 6400 lb.

Moment at R_1 = 6400 x 3 x 12 = 230400 lb. ins.

Required I/c = 230400 ÷ 16000 = 14.4

Use 8" I 18#.

Plate Girders for 10th. Floor

Floor load = 175 lb. per sq. ft.

Limiting distance b. to b.

of Ls = 60.5 ins.

Make depth of web 60 ins.

Beam loads: (see sketch)

(10 + 9) x 7 x 175

= 23300 lb.

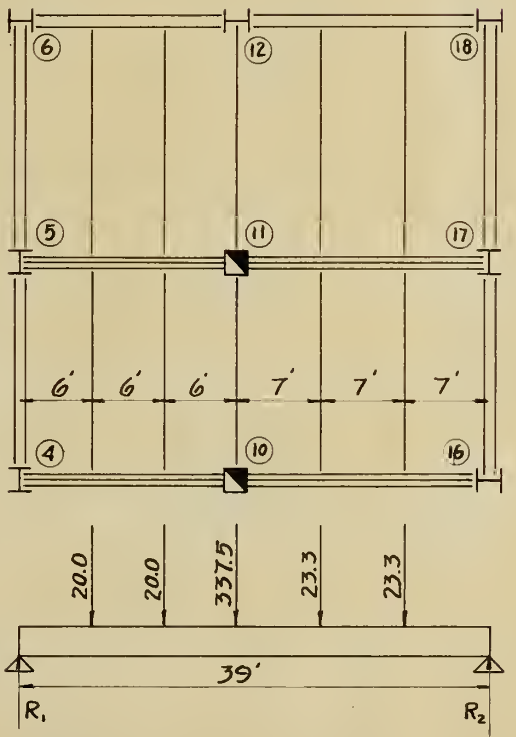
(10 + 9) x 6.5 x 175

= 21620 lb.

(10 + 9) x 6 x 175

= 19950 lb.

Col. load = P = 315900 lb.



R_1 = 1/39 (23.3 x 7 + 23.3 x 14 + 337.5 x 21 + 20 x 27 + 20 x 33) = 225.0

Required thickness of web = 225 ÷ 10 x 60 = 0.375 ins.

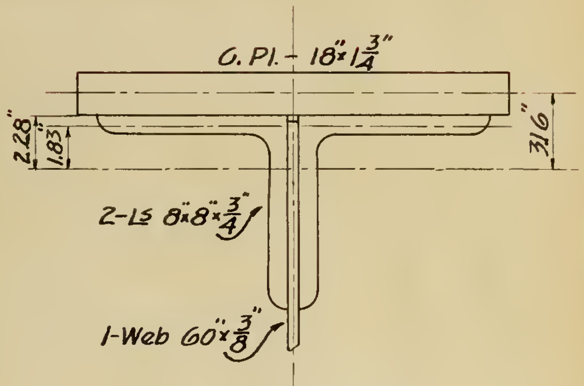
Moment at P = + 225 x 18 - 20 x 12 - 20 x 6 = 3690000 lb. ft.

= 44280000 lb. ins.

Approx. reqd. A for one flange = 44280000 ÷ 16000(60-2) =

= 47.8 sq. ins.

Assume L's to furnish 40 per cent of this or 19.12 sq. ins.



Assume 2 - 8" x 8" x 3/4" Ls

Net A. = 22.88 - 4 x 3/4

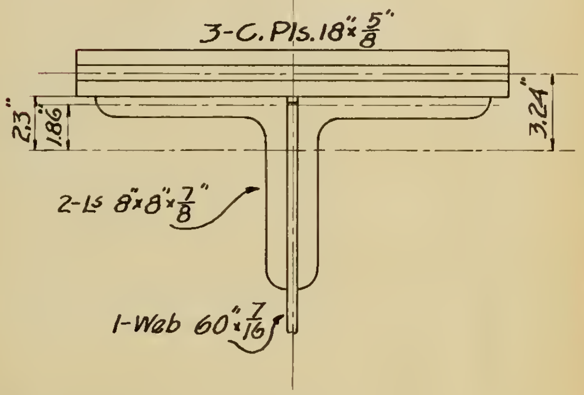
= 19.88 sq. ins.

Required net A. for pls.

= 47.8 - 19.88 = 27.92 sq. ins.

Required thickness of pls.

= 27.92 ÷ 16 = 1.75 ins.



To find neutral axis of flange:

Moment about centroid axis of

Ls = 18 x 1.75 x 3.16 = 99.6

99.6 ÷ (18 x 1.75 + 2 x 11.44)

= 1.83 ins.

Distance of C. of G. of flange from back of angles =

2.28 - 1.83 = 0.45 ins.

Effective depth = 60.5 - 2 x 0.45 = 59.6 ins.

Actual reqd. net A. = 44280000 ÷ 16000 x 59.6 = 46.5 sq. ins.

Wt. of 4 flange Ls per ft. = 4 x 38.9 = 185.6 lb.
Wt. of web per ft. = 76.6 lb.
Wt. of cover pls. per ft. = 214.2 lb.
Total 476.4 lb. per ft.

Use w = 480 lb. per ft.

Moment due to wt. of beam = 1/8 x 480 x 39 x 39 x 12 =

2190000 lb. ins.

Total moment = 46470000 lb. ins.

Approx. reqd. A. for flange = 46470000 ÷ 16000 x 59.6

= 48.7 sq. ins.

0.4 x 48.7 = 19.48 sq. ins.

Assume 8" x 8" x 3/4" Ls

Net A. = 19.88 sq. ins.

Required net A. of pls. = 48.7 - 19.88 = 28.82 sq. ins.

Required thickness of pls. = 28.82/16 = 1.8 ins.

Use 3 - 5/8" pls.

Reaction from wt. of girder = 9370 lb.

Total R = 225000 + 9370 = 234370 lb.

Required thickness of web = 234370 ÷ 10000 x 60 = 0.381

Use 7/16" web.

Lengths of cover pls:

$L = l\sqrt{Sa \div A}$

a = a = a = 16 x 5/8 = 10 sq. ins.

Total net A. = 19.88 + 30 = 49.88 sq. ins.

Make L = 31 ft.

L = 25 ft.

L = 18 ft.

Stack and Tank Loads

Stack:

Assume stack 6 ft. in diameter and made up of 3/8 - inch pls.

Circumference of stack = 6 x 3.14 = 18.84 ft.

Wt. of plate 12" x 3/8" x 1' - 0" = 15.3 lb.

Wt. of 1 ft. cirumferential strip of stack = 18.84 x 15.3 = 288 lb.

If stack is carried every second floor the increment of stack load load going to columns = 24 x 288 = 6920 lb.

Tank:

Assume tank 12 ft. in diameter by 8 ft. in height and as having a shell with a mean thickness of 3/8 - inch.

Area of cylindrical portion of shell = 12 x 3.14 x 8

= 301.3 sq. ft.

Area of bottom of tank = 3.14 x 6 x 6 = 113 sq. ft.

Total area = 414.3 sq. ft.

Wt. of shell = 414.3 x 15.3 = 6340 lb.

Wt. of water = 113 x 8 x 62.5 = 56600 lb.

Total wt. = 62940 lb.

62940 ÷ 4 = 15760 lb. carried by each of columns 21,22,27, and 28.

Grillages

Column # 1:

Load = 738000 lb. = W

All grillages to be made of Is spaced 9" on centers.

Allowable pressure on foundation

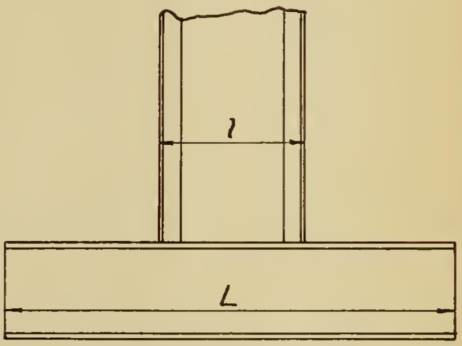
= 350 lb. per sq. in.

= 50400 lb. per sq. ft.

Allowable pressure per lineal ft.

of I-beam = 37800 lb.

738000 ÷ 37800 = 19.6 ft. of Is reqd.



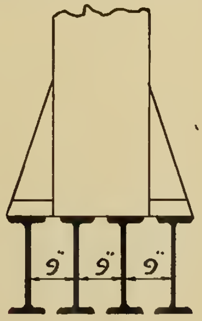
Assume 4 Is 5 ft. long.

For one I moment =

1/8 x W/4 (L - 1)

= 1/8 x 184500(60 - 14) =

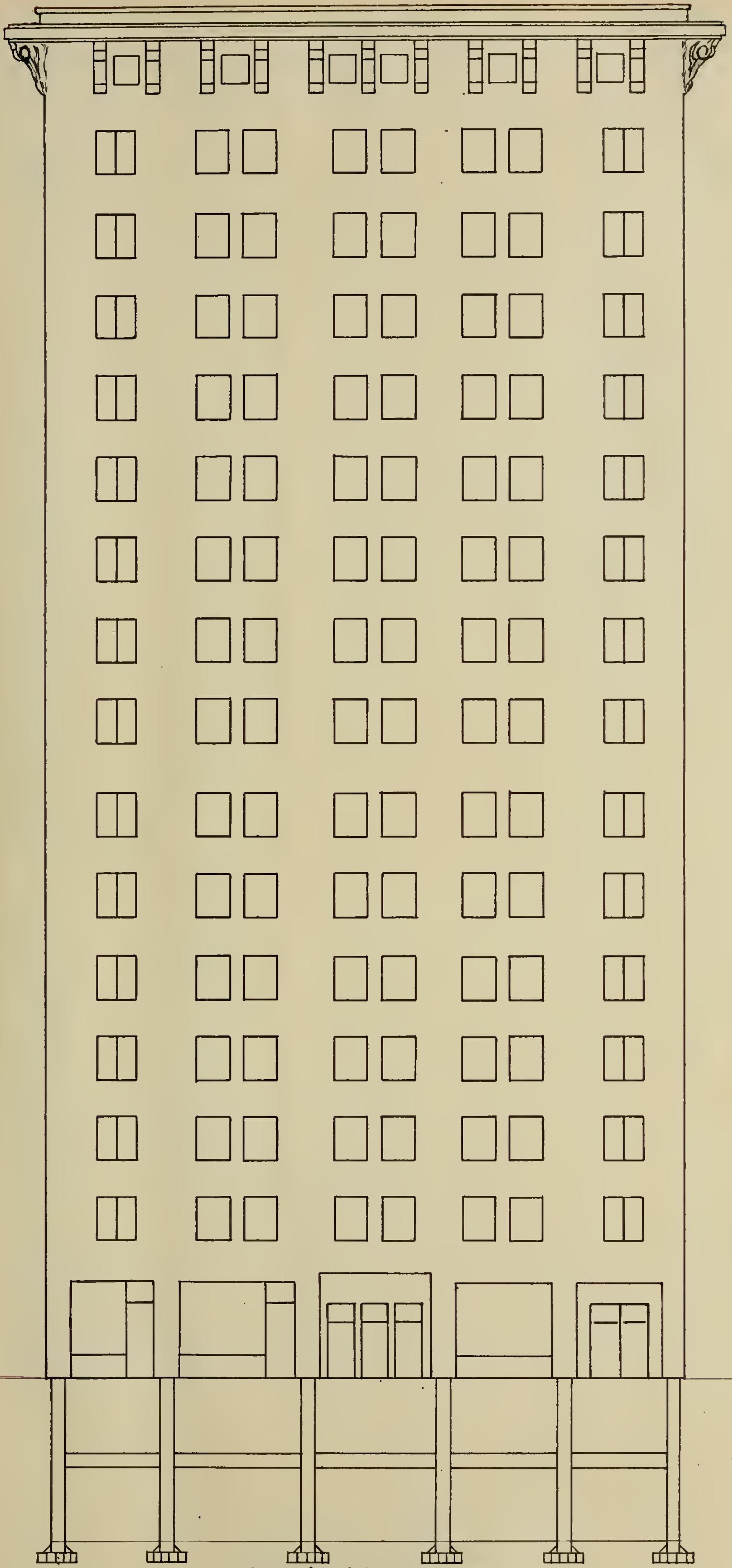
1060000 lb. ins.



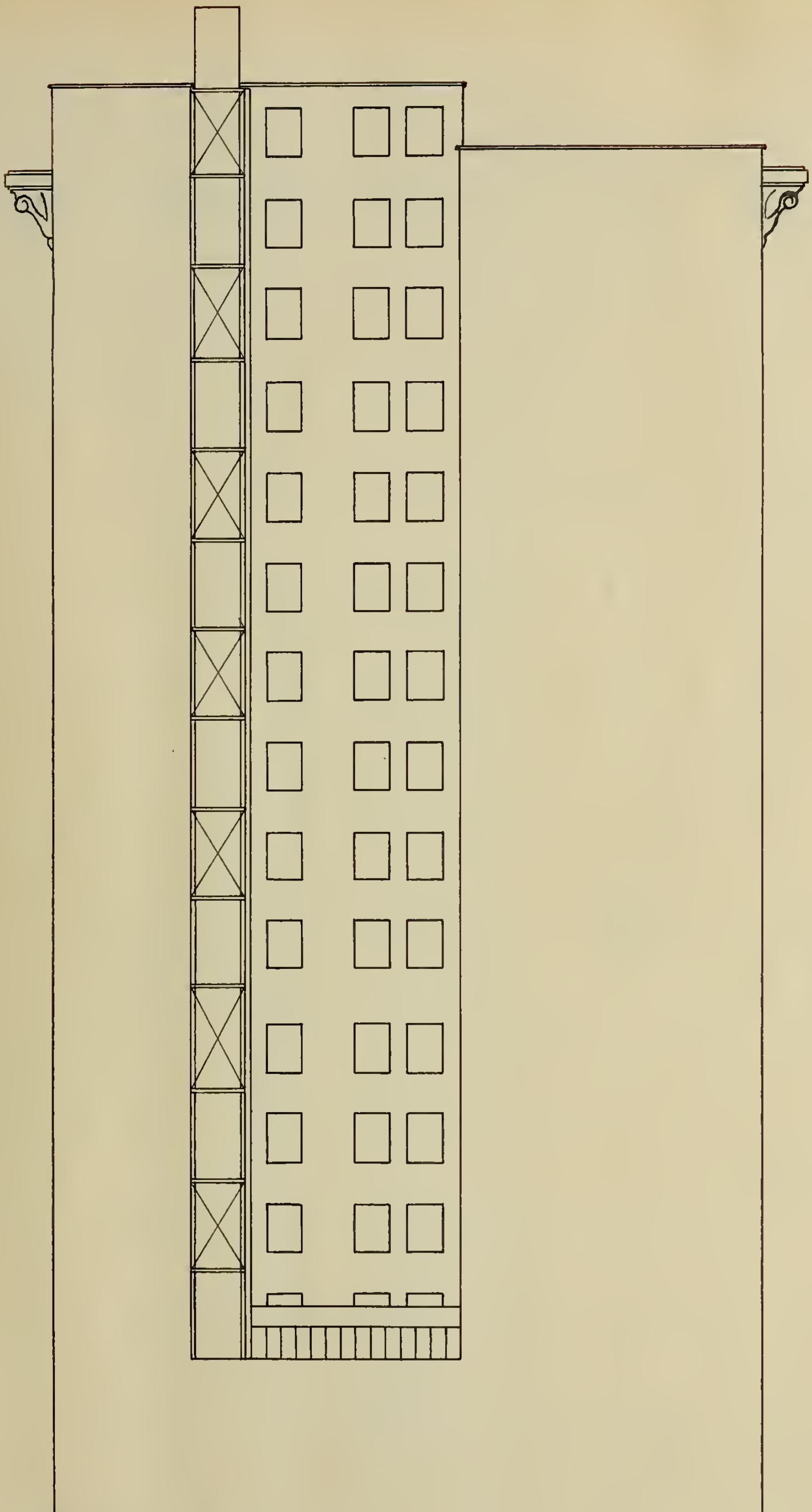
Required I/c = 1060000 ÷ 16000 = 66.3

A 15" I 55# has the required I/c and is safe against crippling,as seen from table on page 74 of Cambria.

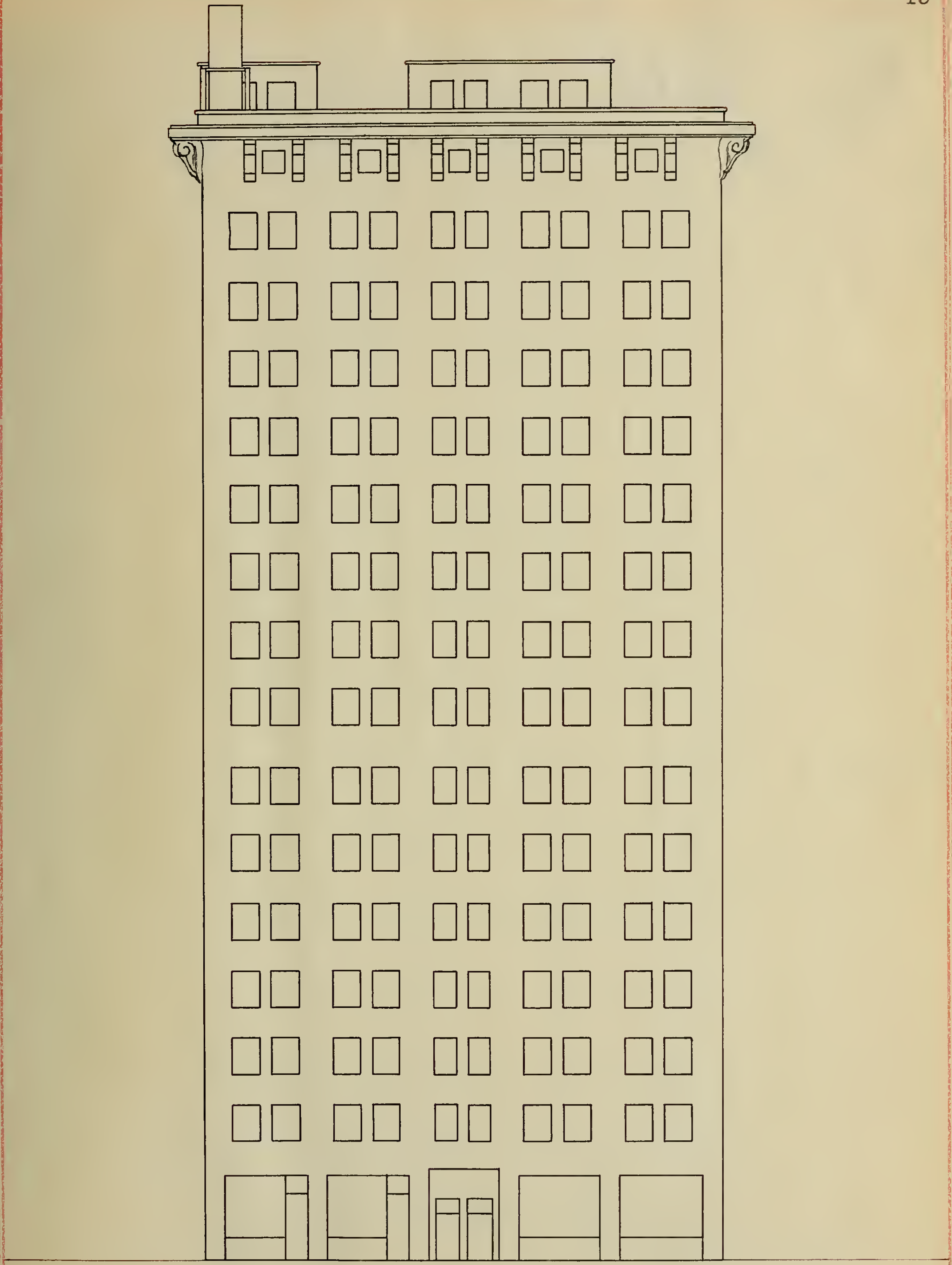
Use 4 - 15" Is 55# x 5' - 0"



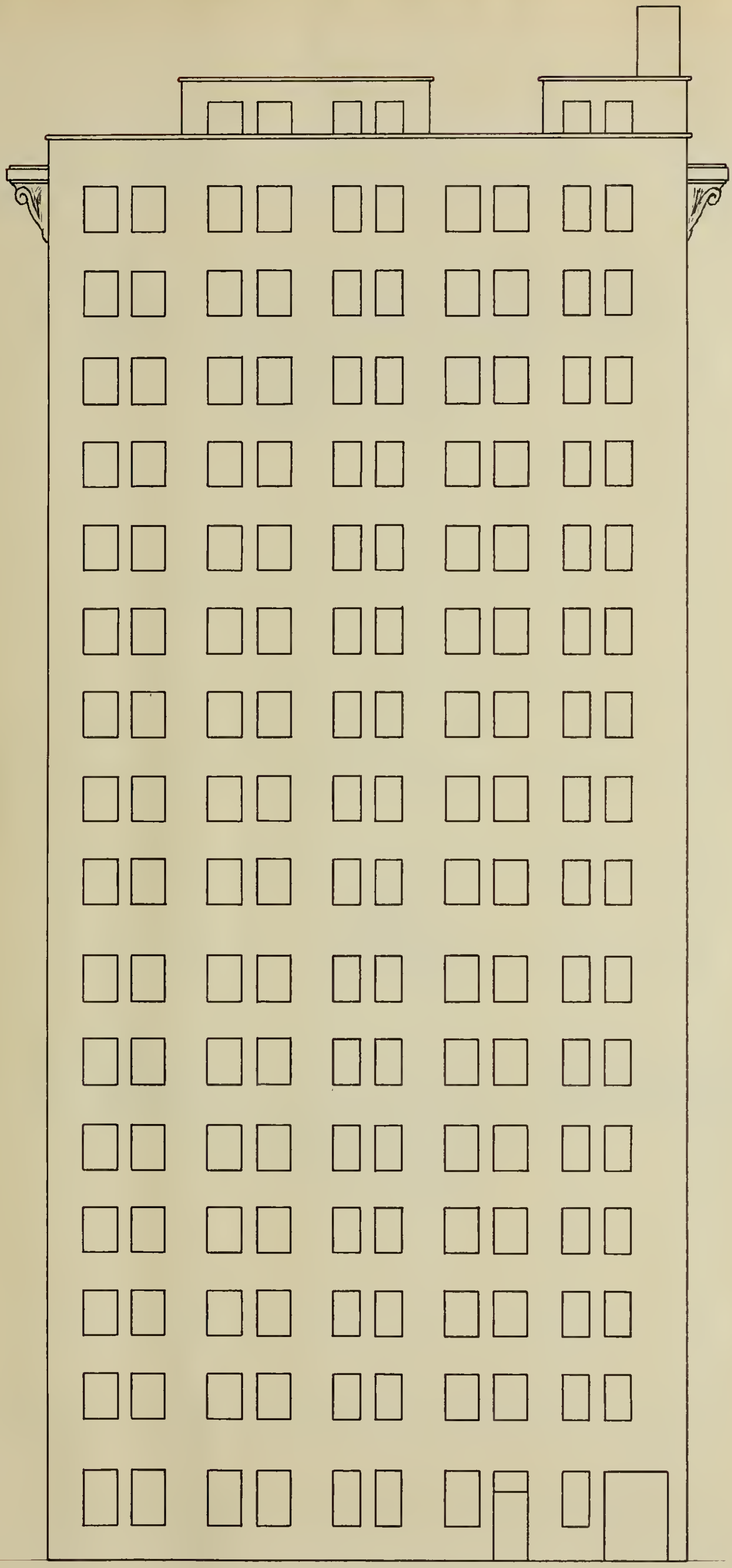
South Elevation



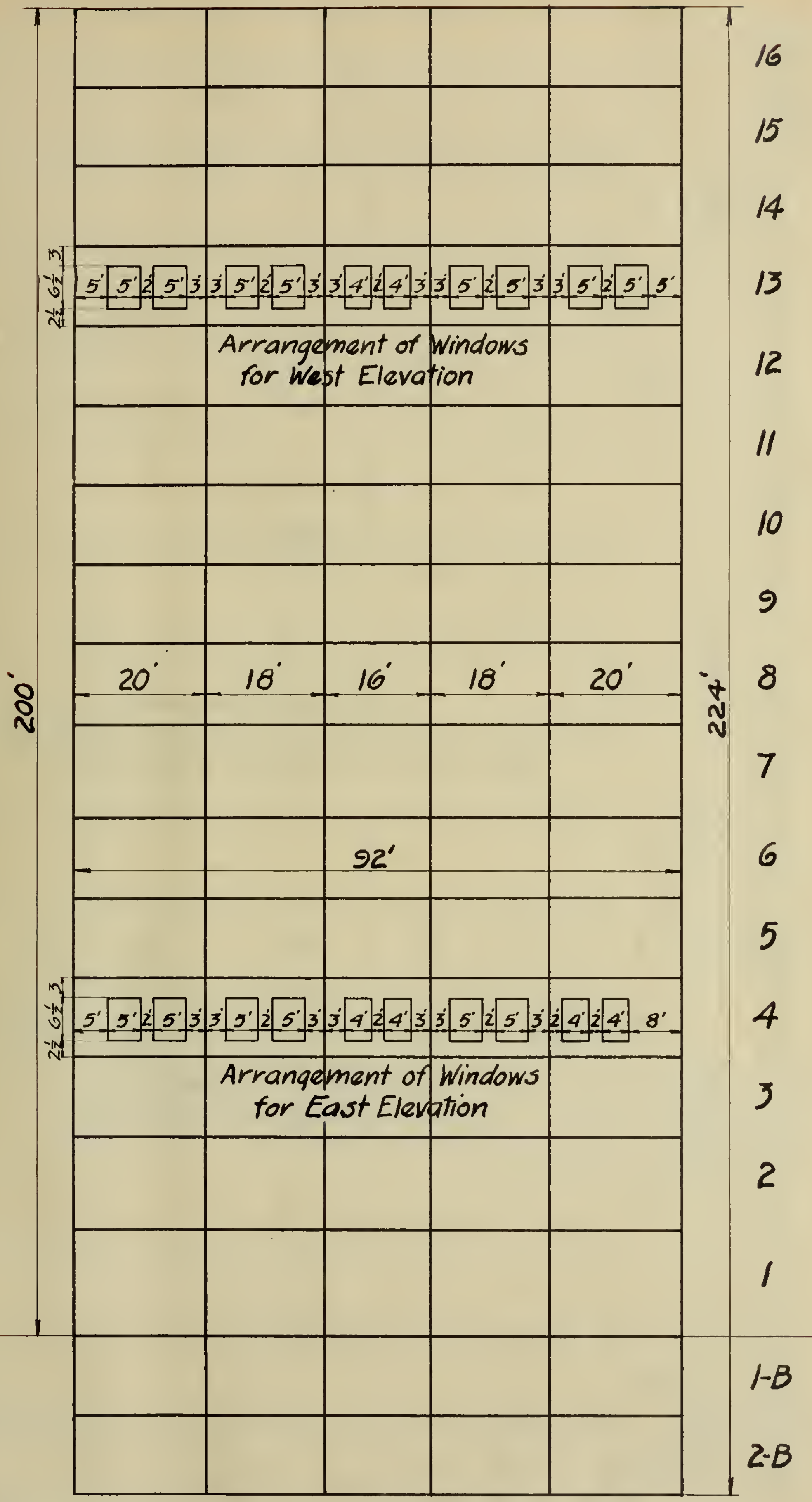
North Elevation



West Elevation

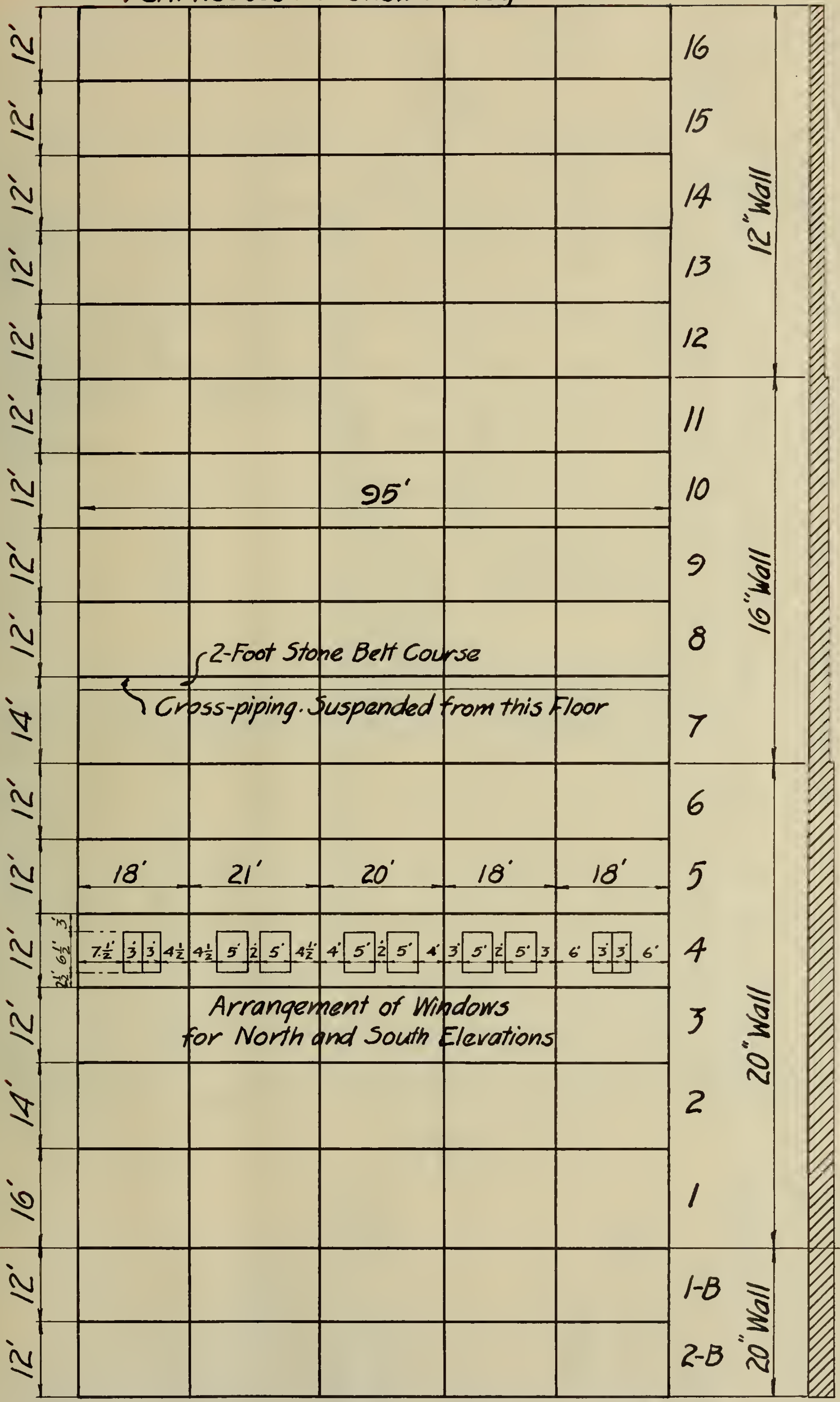


East Elevation

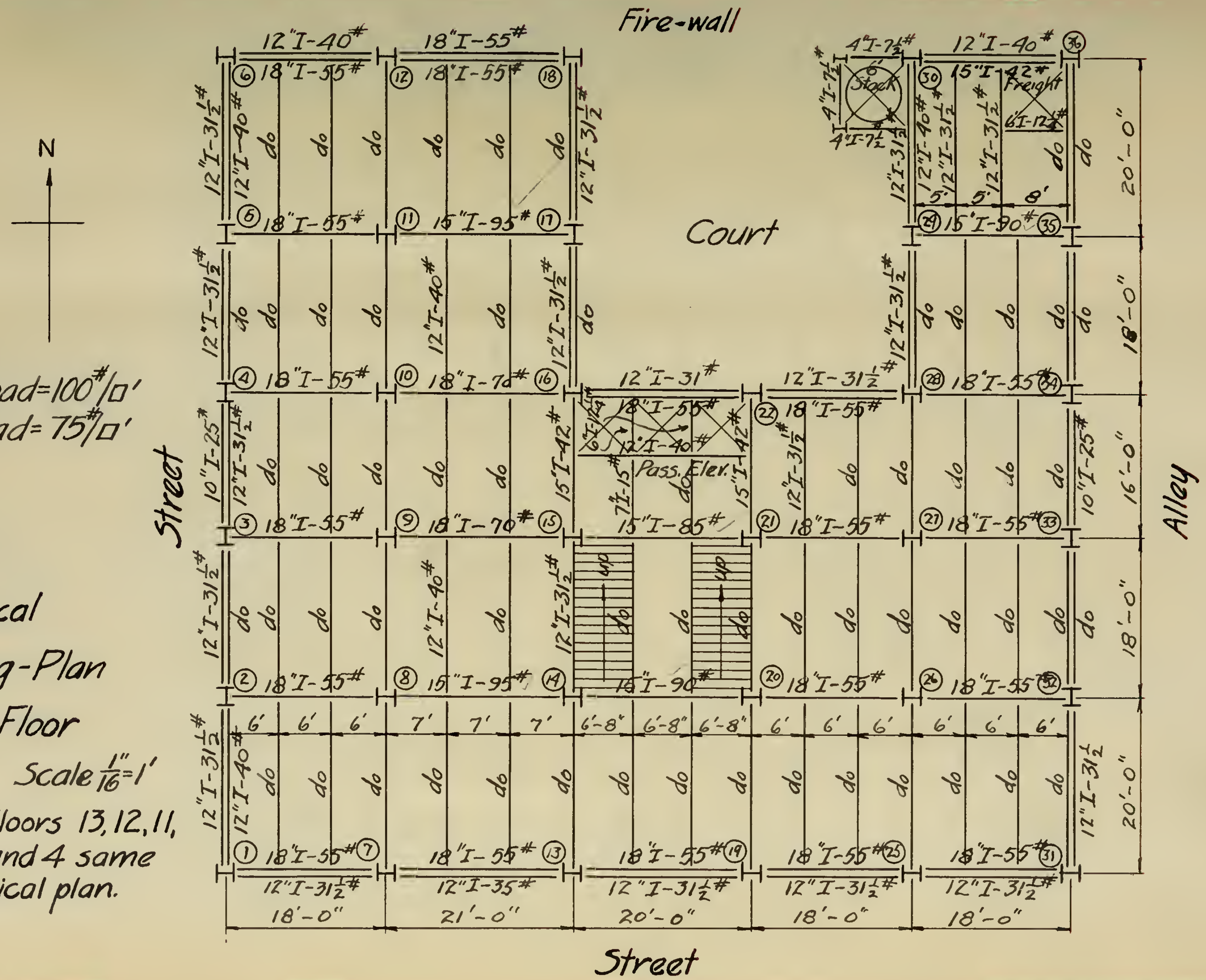


Skeleton Diagram for East and West Elevations

Pent Houses not shown – Height = 12'



Skeleton Diagram for North and South Elevations



Dead Load=100#/□'
Live Load= 75#/□'

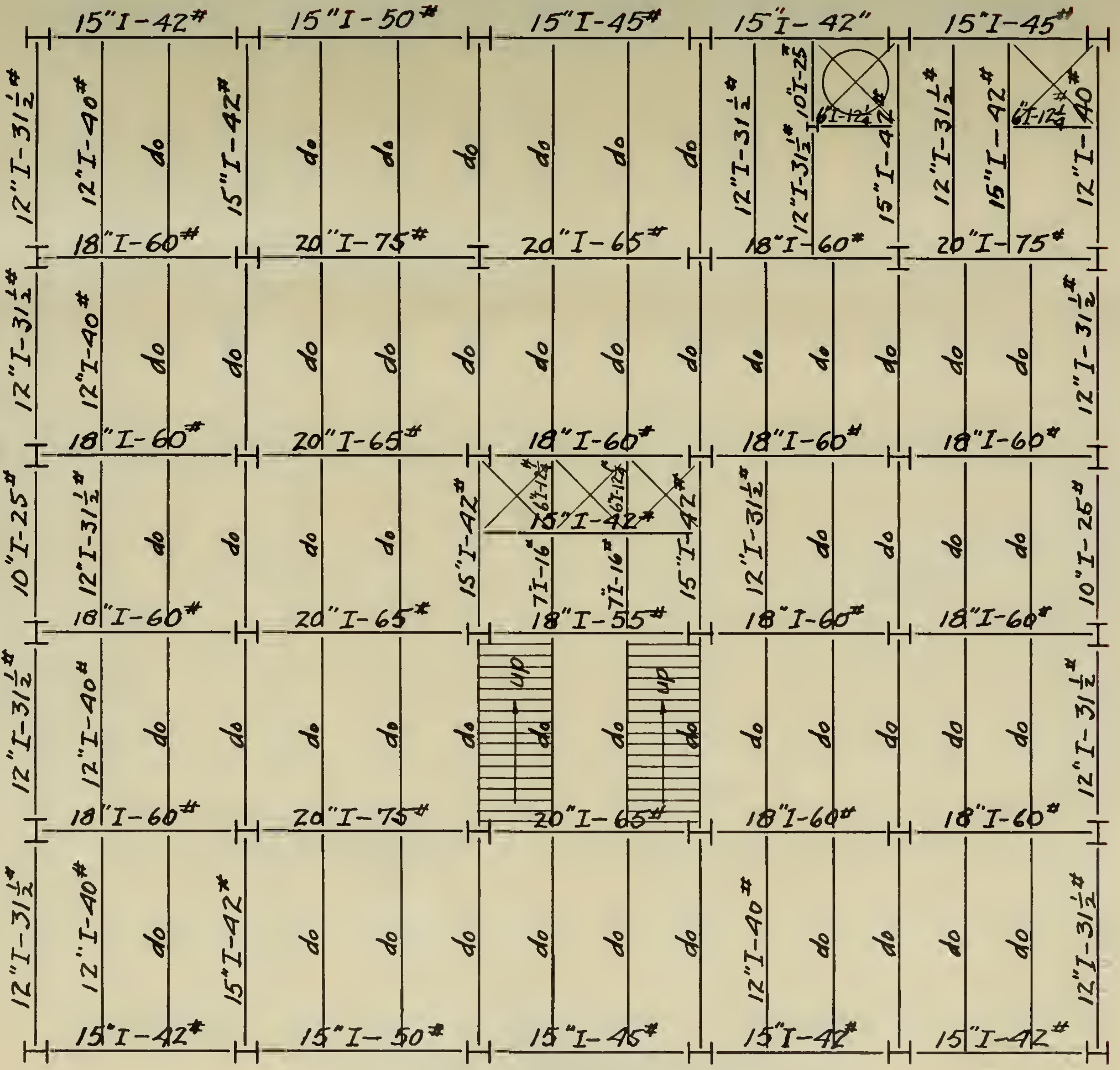
Typical
Framing-Plan
Office Floor

Scale 1/16"=1'

Frame floors 13, 12, 11,
7, 6, 5, and 4 same
as typical plan.

Dead Load = 100#/□'
Live Load = 100#/□'

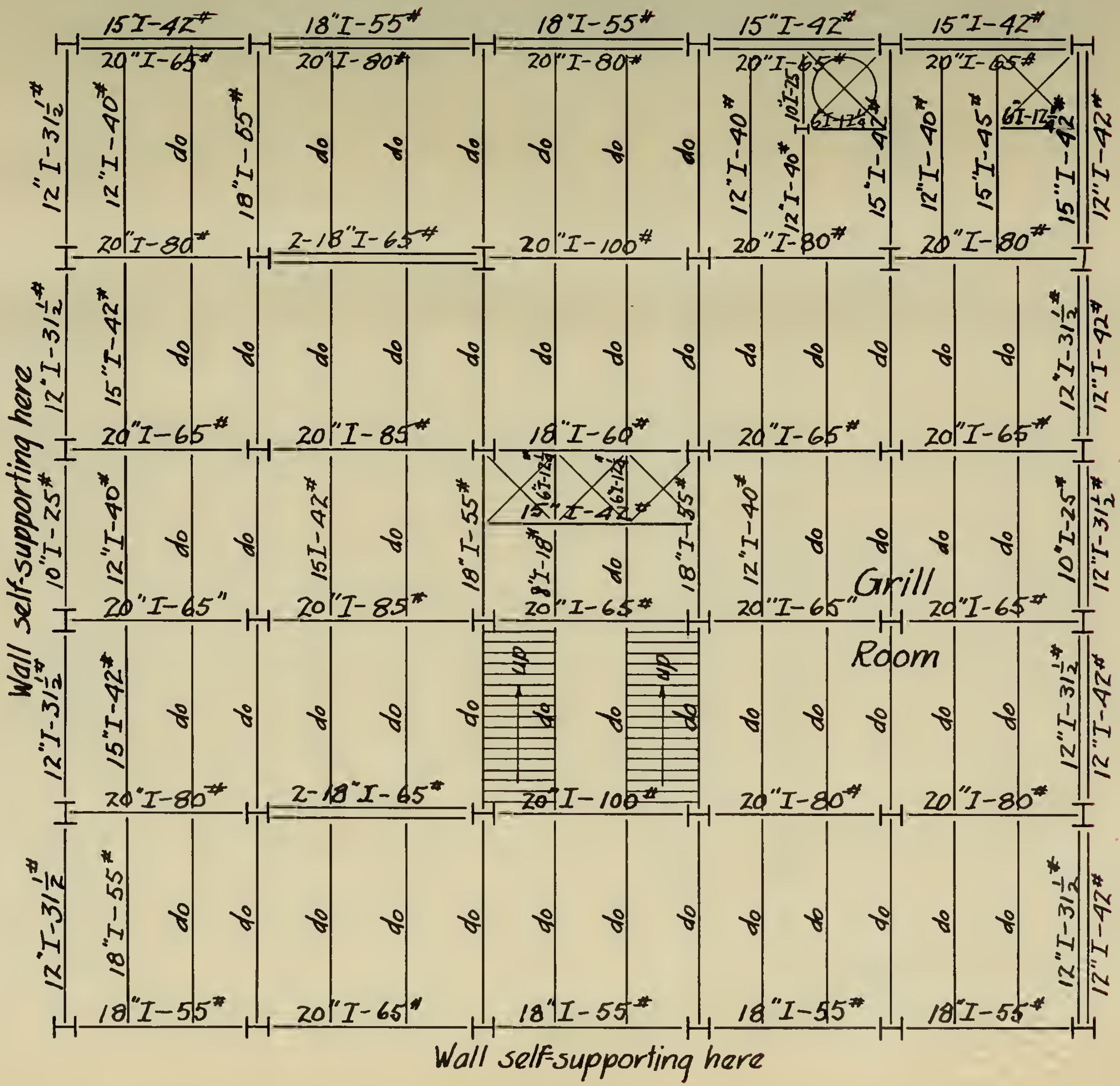
Plan
of
1st. Basement
Framing



All exterior walls self-supporting

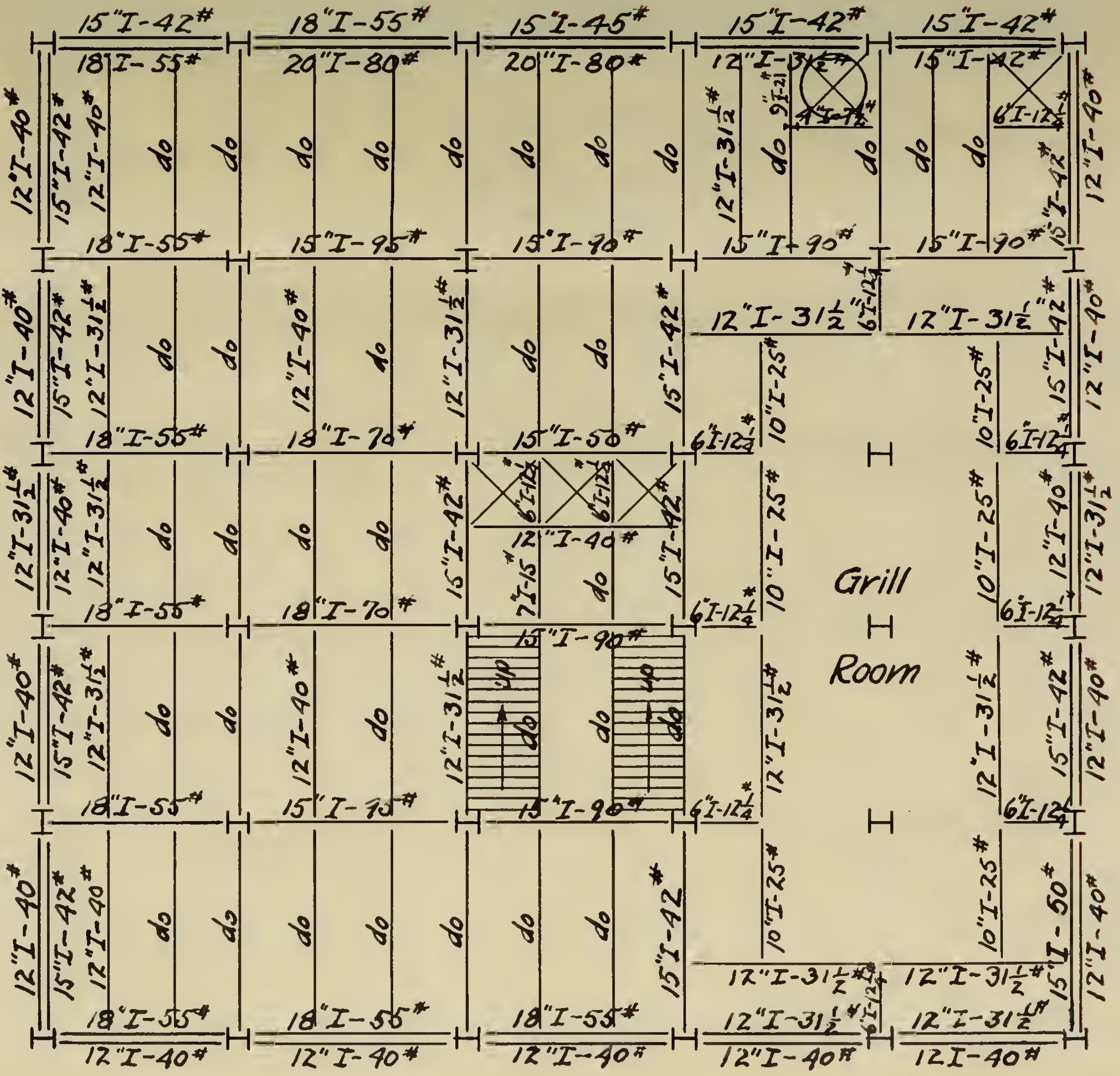
Dead Load = 150#/□'
Live Load = 100#/□'

Plan
of
1st Floor
Framing

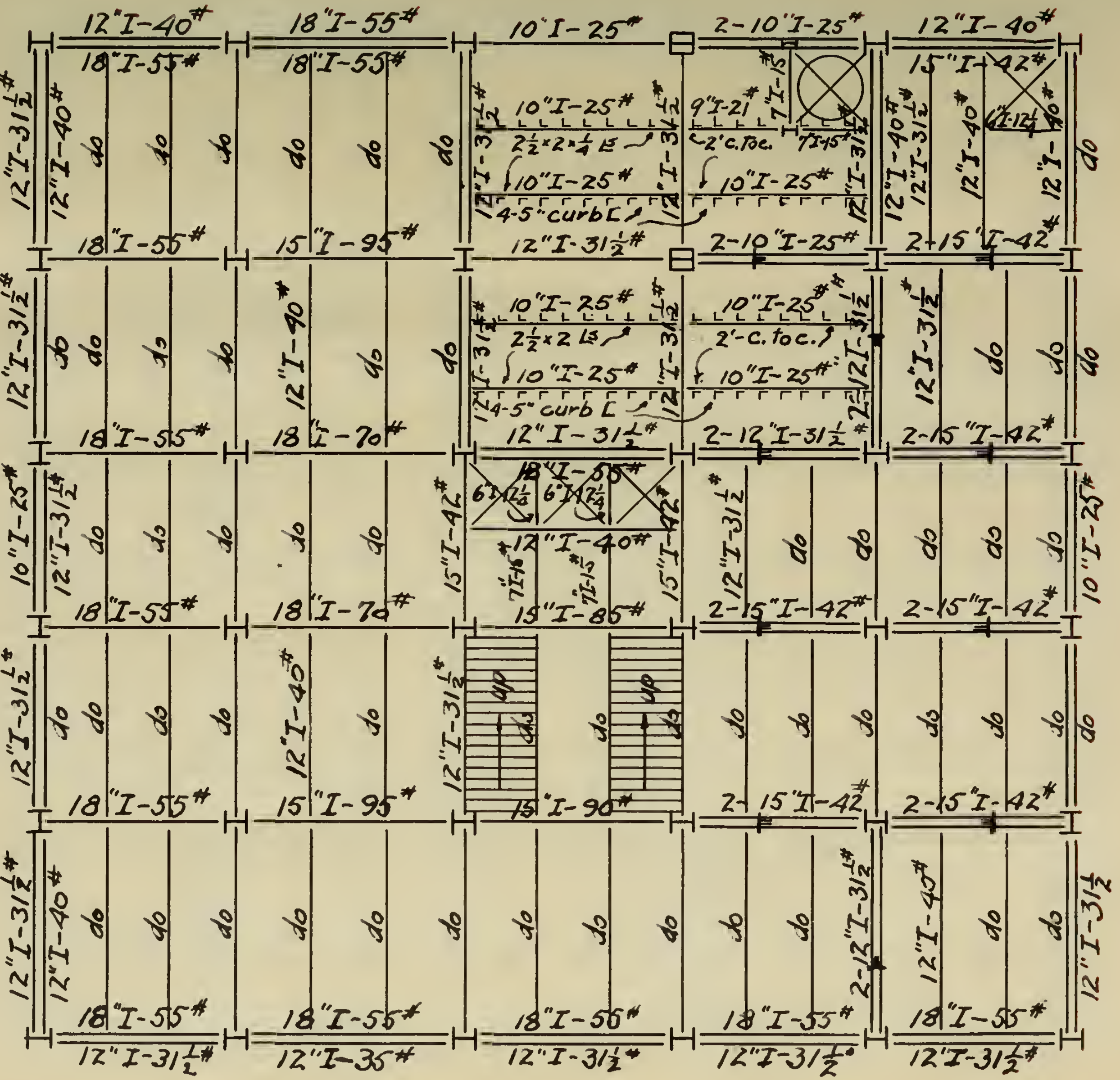


Loading same as used for typical floor.

Plan of 2nd Floor Framing



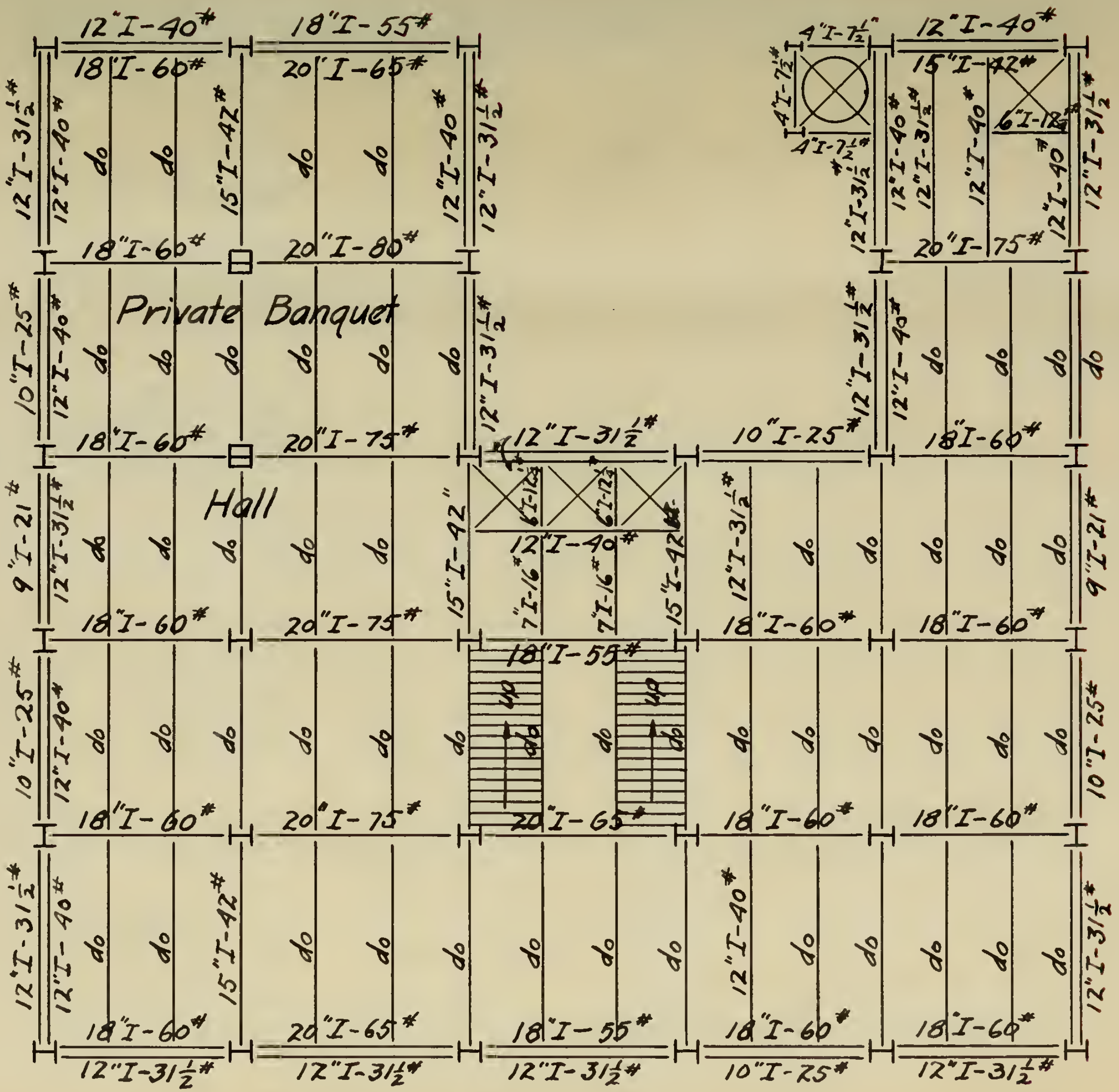
Loading same as used
for typical floor



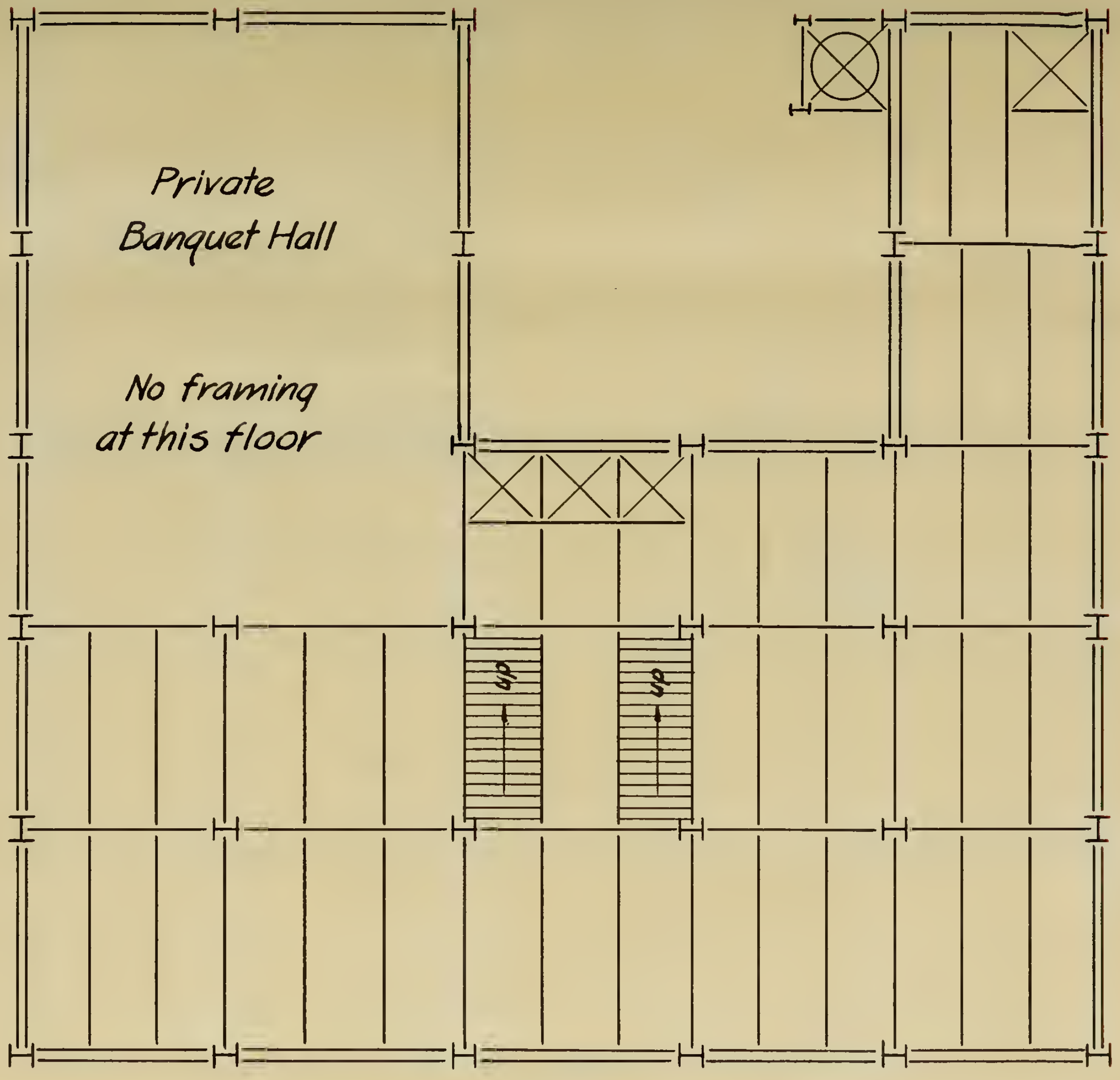
Plan
of
3rd Floor
Framing

Dead Load = 125#/□'
Live Load = 75#/□'
Hall Live Load = 90#/□'

Plan
of
8th Floor
Framing

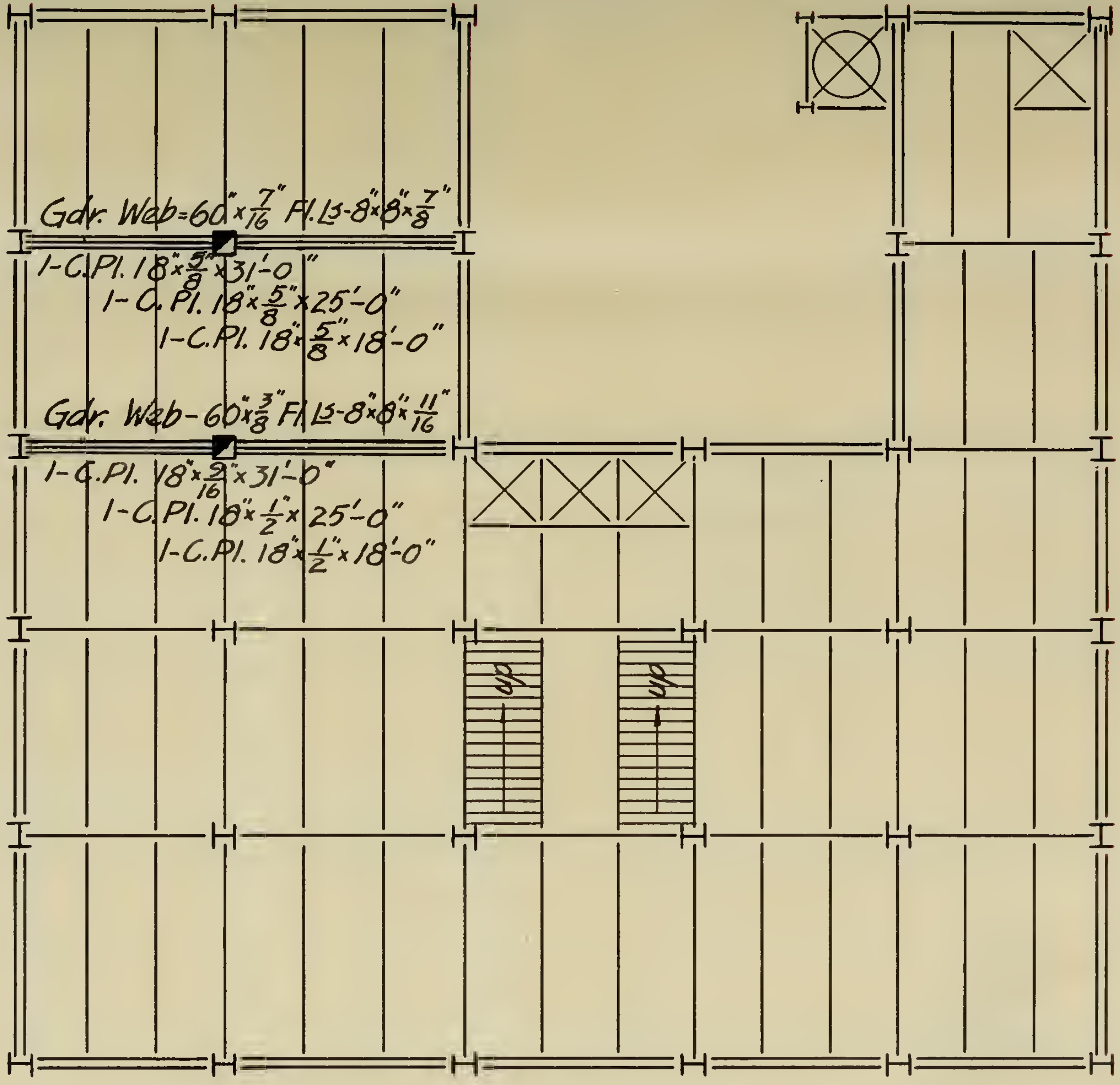


Plan
of
9th Floor
Framing



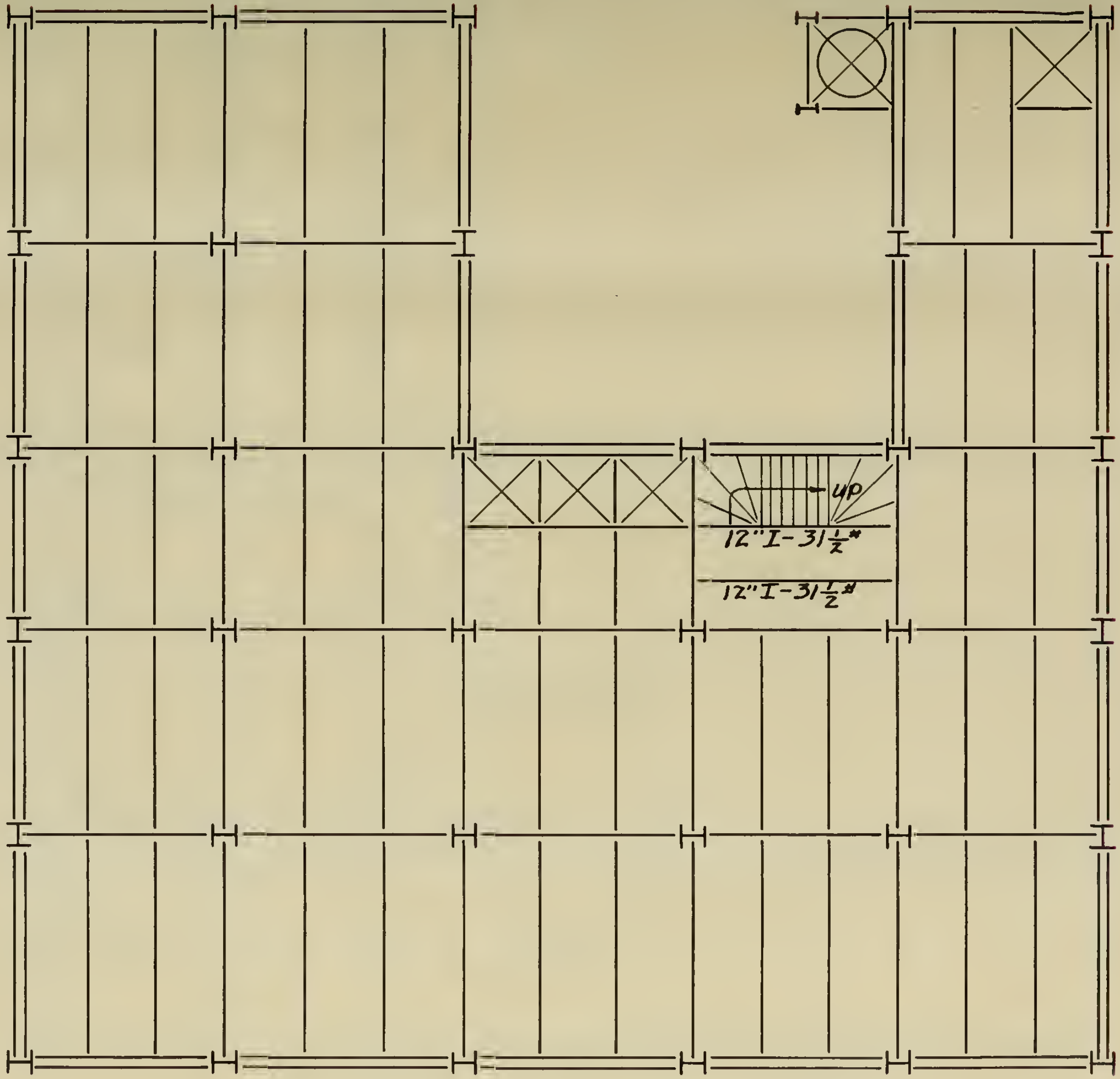
Typical framing except as noted

Plan of 10th Floor Framing



Typical framing except as noted.

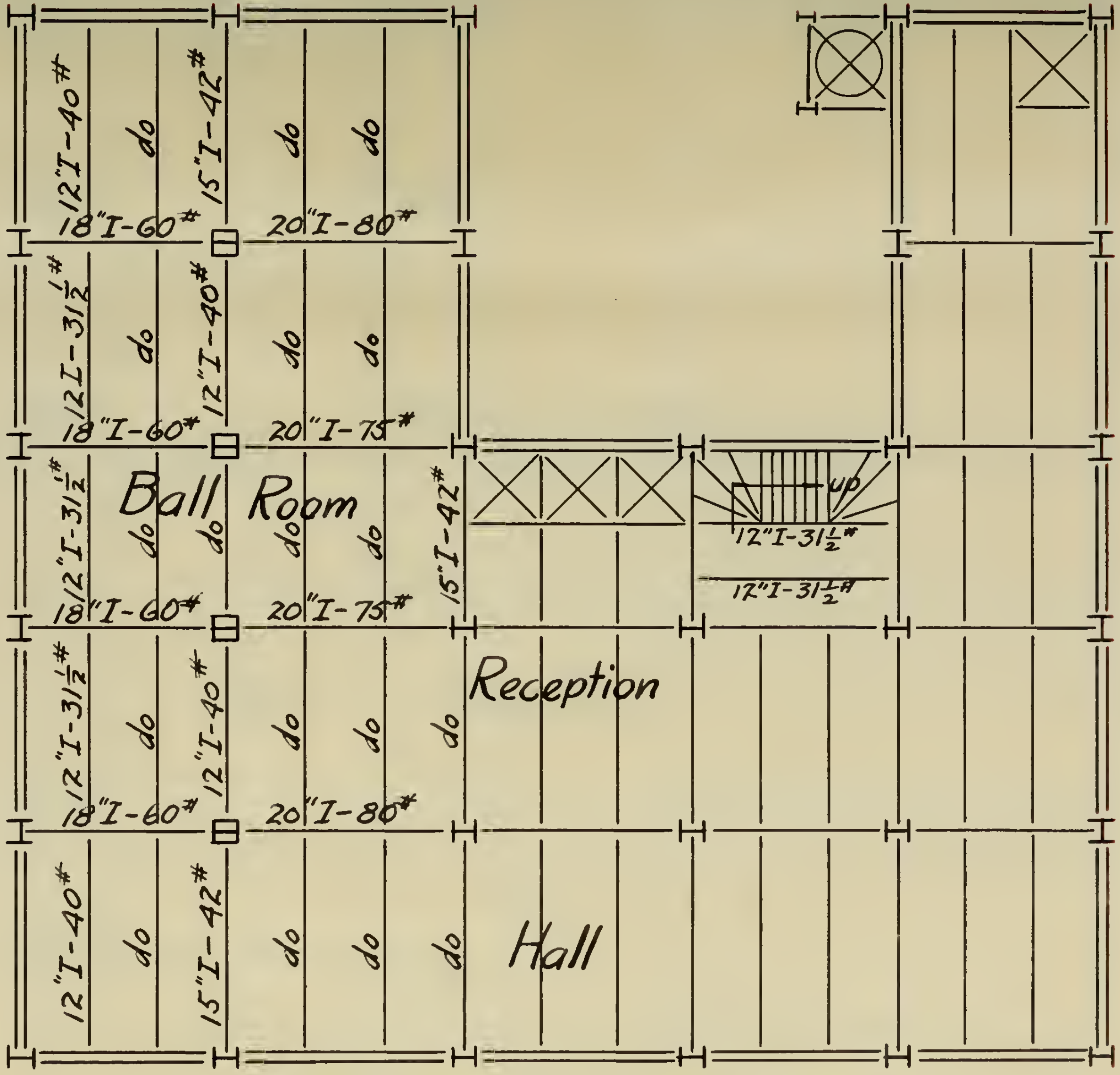
Plan
of
14th. Floor
Framing



Typical framing except as noted

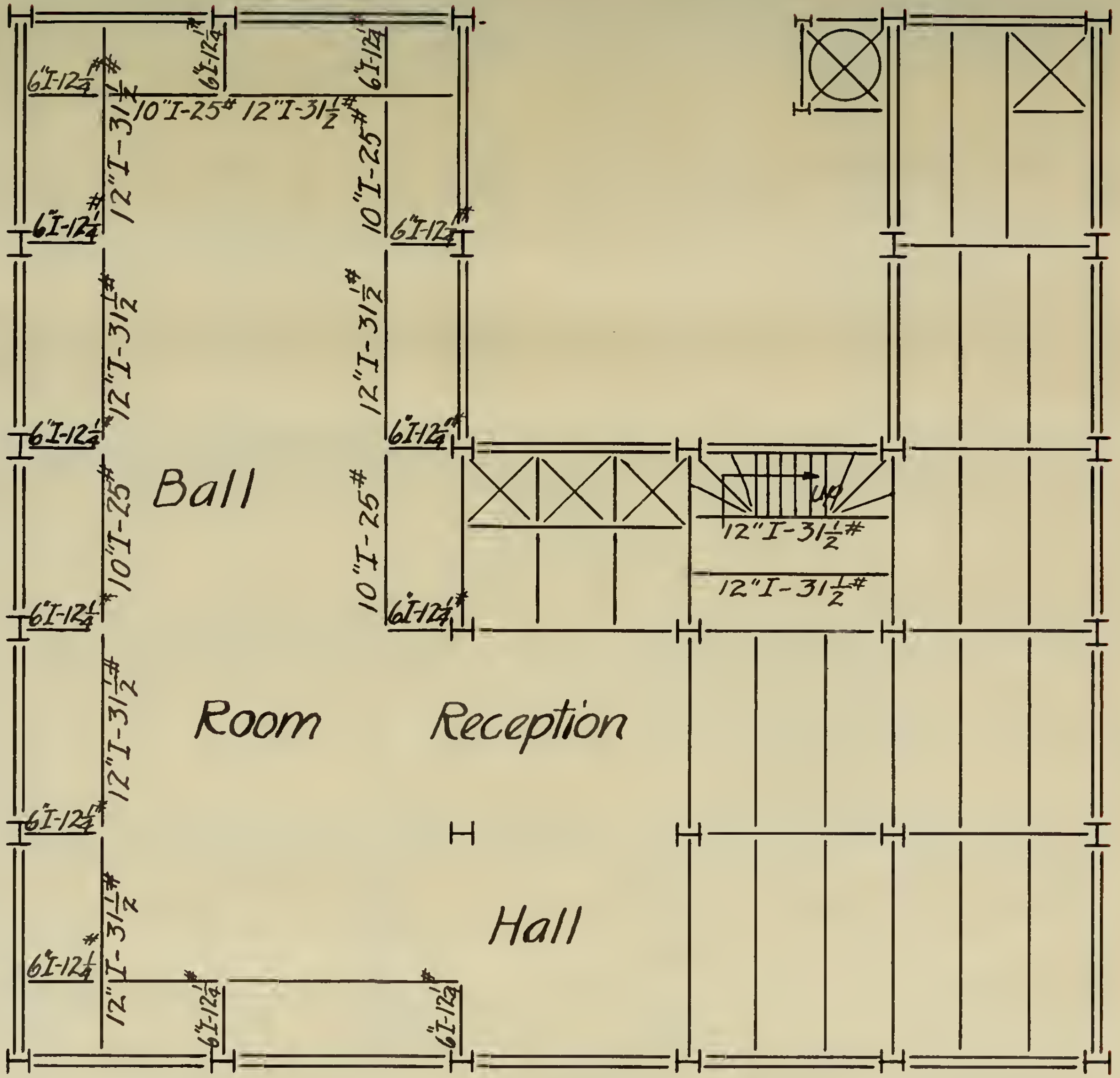
Dead Load = 100#/□'
Sp. Live Load = 90#/□'

Plan
of
15th Floor
Framing



Typical framing except as noted

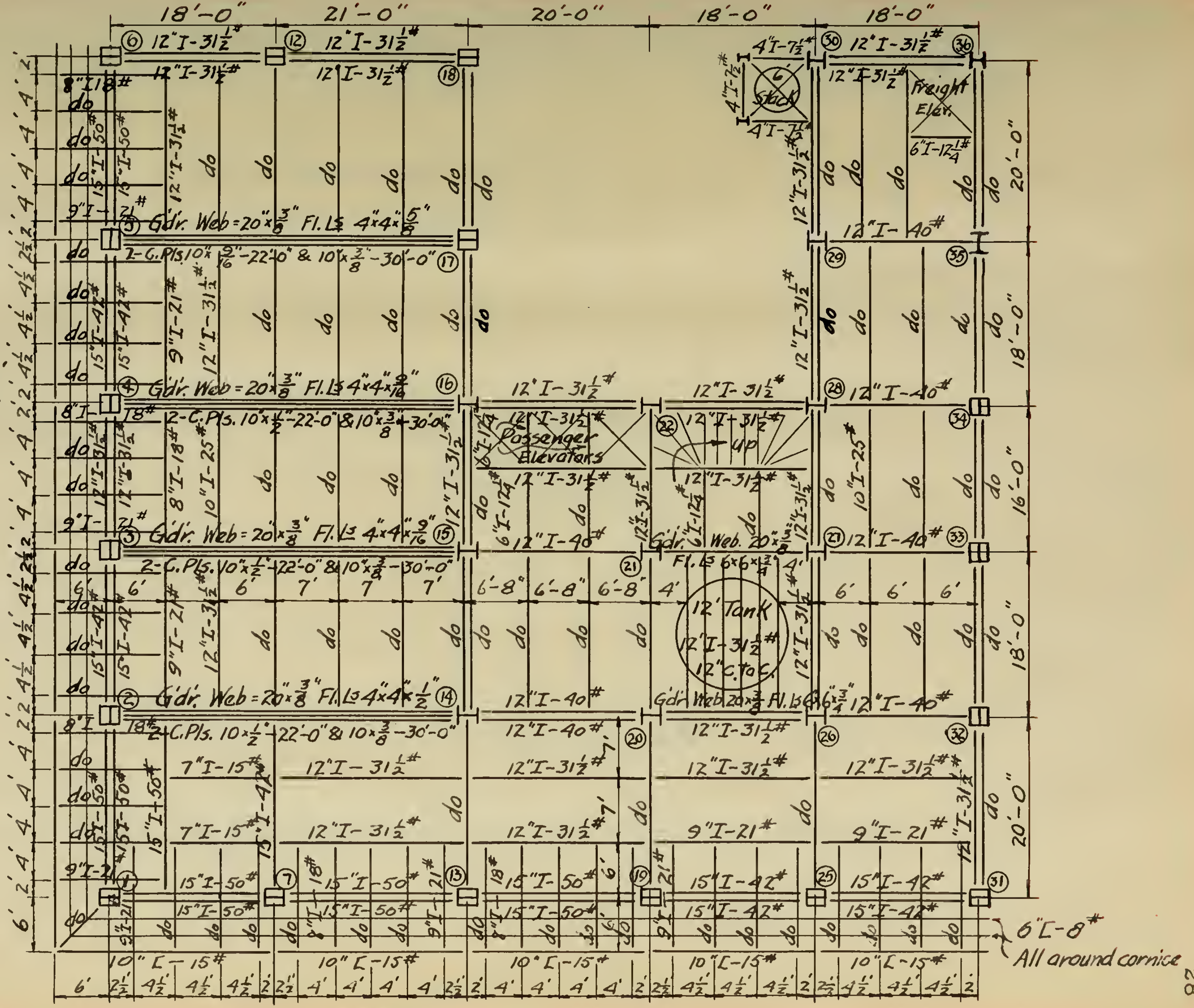
Plan
of
16th Floor
Framing

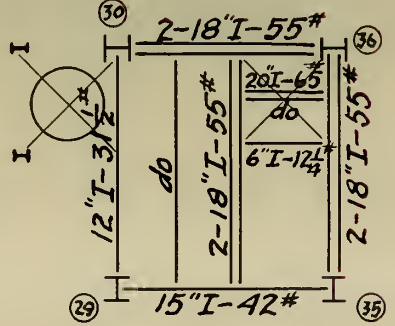


Typical framing except as noted

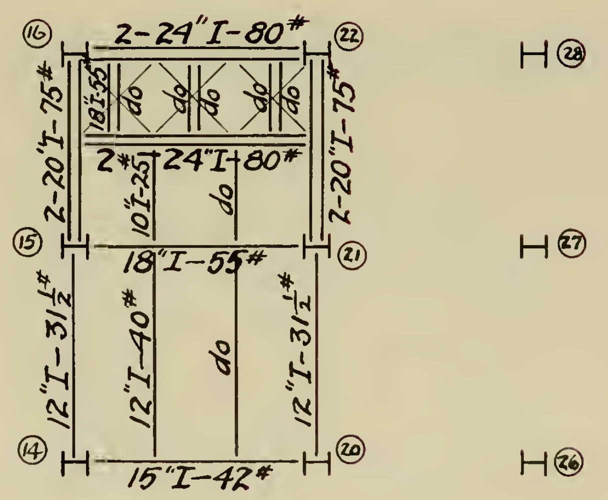
Dead Load=50#/□'
Live Load=50#/□'

Plan of Roof Framing

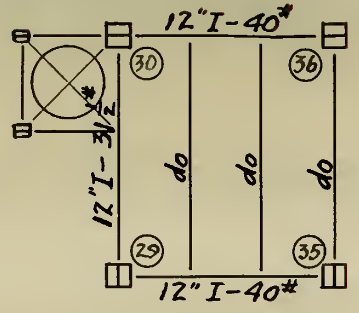


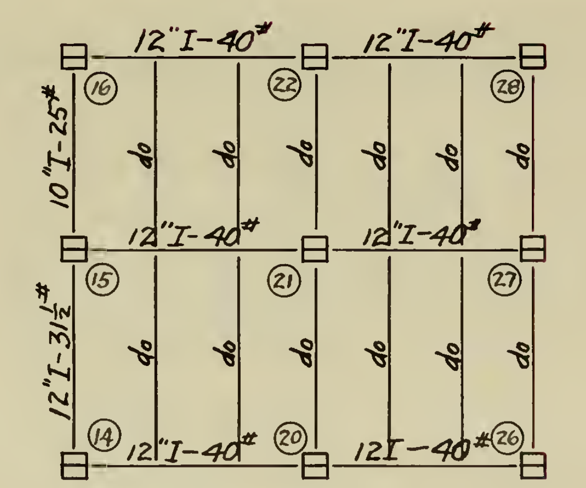


Plan of Framing for Freight-Elevator Platform



Plan of Framing for Passenger-Elevator Platform





Plans of Framing for Roofs
of Pent-Houses

LOAD TABLE - COL. NO. 26

Story	Dead Fl. L. lb./sq.ft.	Reduced Fl. L. L. lb./sq.ft.	Fl. L. each Fl. lb./sq.ft.	Area for Col. sq.ft.	Fl. L. each Fl. in 1000 lb.	Total L. on Col. in 1000 lb
Roof	50	50	100	81.0	8.1	8.1
16	50	50	100	342.0	69.4	*77.5
15	100	75	175	342.0	59.9	137.4
14	100	71.25	171.25	342.0	58.6	196.0
13	100	67.5	167.5	342.0	57.3	253.3
12	100	63.75	163.75	342.0	56.0	309.3
11	100	60	160	342.0	54.7	364.0
10	100	56.25	156.25	342.0	53.4	417.4
9	100	52.5	152.5	342.0	52.2	469.6
8	100	48.75	148.75	342.0	50.9	520.5
7	125	45	145	342.0	58.2	578.7
6	100	41.25	141.25	342.0	48.3	627.0
5	100	37.5	137.5	342.0	47.0	674.0
4	100	37.5	137.5	342.0	47.0	721.0
3	100	37.5	137.5	342.0	47.0	768.0
2	100	37.5	137.5	342.0	47.0	815.0
1	—	—	—	—	—	815.0
1-B.	150	100	250	342.0	85.5	900.5
2-B.	150	100	250	342.0	85.5	986.0

* Includes tank and pent-house wall loads.

LOAD TABLE - COL. NO. 3

Story	Dead Fl. L. lb./sq.ft.	Reduced Fl. L. L. lb./sq.ft.	Fl. L. each Fl. lb./sq.ft.	Area for Col. sq.ft.	Fl. L. each Fl. in 1000 lb.	Total Fl. L. in 1000 lb.	Wall L. each Fl. in 1000 lb.	Total Wall L. in 1000 lb.	Total L. on Col. in 1000 lb.
Roof									
16	50	50	100	331.5	33.2	33.2	29.9	29.9	63.1
15	100	75	175	102.0	17.9	51.1	22.3	52.2	103.3
14	100	90	190	153.0	29.1	80.2	16.8	69.0	149.2
13	100	71.25	171.25	153.0	26.2	106.4	16.8	85.8	192.2
12	100	67.5	167.5	153.0	25.6	132.0	16.8	102.6	234.6
11	100	63.75	163.75	153.0	25.1	157.1	16.8	119.4	276.5
10	100	60	160	153.0	24.5	181.6	22.5	141.9	323.5
9	100	56.25	156.25	153.0	23.9	205.5	22.5	164.4	369.9
8	100	52.5	152.5	81.0	12.2	217.7	22.5	186.9	404.6
7	125	53.3	128.3	153.0	27.3	245.0	22.5	209.4	454.4
6	100	45	145	153.0	22.2	267.2	27.0	236.4	503.6
5	100	41.25	141.25	153.0	21.6	288.8	28.1	264.5	553.3
4	100	37.5	137.5	153.0	21.1	309.9	28.1	292.6	602.5
3	100	37.5	137.5	153.0	21.1	331.0	28.1	320.7	651.7
2	100	37.5	137.5	153.0	21.1	352.1	28.1	348.8	700.9
1	100	37.5	137.5	153.0	21.1	373.2	33.7	382.5	755.7
1-B.	150	100	250	153.0	38.3	411.5	4.0	386.5	798.0
2-B.	100	100	200	153.0	30.6	442.1	0.0	386.5	828.6

COLUMN SCHEDULE

	Column No. 1		Column No. 2		Column No. 3	
Story	**Load**	**Section**	**Load**	**Section**	**Load**	**Section**
Roof	—		—		—	
16	50.8	4 Ls 4" x 3" x $\frac{5}{16}$" 1 Pl. 12" x $\frac{5}{16}$"	70.4	4 Ls 4" x 3" x $\frac{5}{16}$" 1 Pl. 12" x $\frac{5}{16}$"	63.1	4 Ls 4" x 3" x $\frac{5}{16}$" 1 Pl. 12" x $\frac{5}{16}$"
15	87.8		114.7		103.3	
14	125.9	4 Ls 5" x 3$\frac{1}{2}$" x $\frac{5}{16}$" 1 Pl. 12" x $\frac{5}{16}$"	165.6	4 Ls 6" x 4" x $\frac{3}{8}$" 1 Pl. 12" x $\frac{3}{8}$"	149.2	4 Ls 5" x 3$\frac{1}{2}$" x $\frac{3}{8}$" 1 Pl. 12" x $\frac{3}{8}$"
13	162.3		213.3		192.2	
12	198.4	4 Ls 6" x 4" x $\frac{3}{8}$" 1 Pl. 12" x $\frac{3}{8}$"	260.3	4 Ls 6" x 4" x $\frac{3}{8}$" 1 Web 12" x $\frac{3}{8}$" 2 Covs. 14" x $\frac{5}{16}$"	234.6	4 Ls 6" x 4" x $\frac{3}{8}$" 1 Web 12" x $\frac{3}{8}$" 2 Covs. 14" x $\frac{5}{16}$"
11	233.1		306.7		276.5	
10	276.5	4 Ls 6" x 4" x $\frac{1}{2}$" 1 Web 12" x $\frac{1}{2}$" 2 Covs. 14" x $\frac{7}{16}$"	358.6	4 Ls 6" x 4" x $\frac{7}{16}$" 1 Web 12" x $\frac{7}{16}$" 2 Covs. 14" x $\frac{3}{8}$"	323.5	4 Ls 6" x 4" x $\frac{3}{8}$" 1 Web 12" x $\frac{3}{8}$" 2 Covs. 14" x $\frac{3}{8}$"
9	318.6		409.8		369.9	
8	360.3	4 Ls 6" x 4" x $\frac{1}{2}$" 1 Web 12" x $\frac{1}{2}$" 2 Covs. 14" x $\frac{7}{16}$"	460.3	4 Ls 6" x 4" x $\frac{11}{16}$" 1 Web 12" x $\frac{1}{2}$" 2 Covs. 14" x $\frac{5}{8}$"	404.6	4 Ls 6" x 4" x $\frac{7}{16}$" 1 Web 12" x $\frac{7}{16}$" 2 Covs. 14" x $\frac{7}{16}$"
7	403.9		514.6		454.4	
6	449.5	4 Ls 6" x 4" x $\frac{1}{2}$" 1 Web 12" x $\frac{1}{2}$" 2 Covs. 14" x $\frac{1}{2}$"	567.2	4 Ls 6" x 4" x $\frac{11}{16}$" 1 Web 12" x $\frac{1}{2}$" 2 Covs. 14" x $\frac{5}{8}$"	503.6	4 Ls 6" x 4" x $\frac{5}{8}$" 1 Web 12" x $\frac{1}{2}$" 2 Covs. 14" x $\frac{9}{16}$"
5	497.3		623.0		553.3	
4	544.7	4 Ls 6" x 4" x $\frac{5}{8}$" 1 Web 12" x $\frac{1}{2}$" 2 Covs. 14" x $\frac{5}{8}$"	677.1	4 Ls 6" x 4" x $\frac{11}{16}$" 1 Web 12" x $\frac{1}{2}$" 2 Covs. 14" x $\frac{15}{16}$"	602.5	4 Ls 6" x 4" x $\frac{11}{16}$" 1 Web 12" x $\frac{1}{2}$" 2 Covs. 14" x $\frac{3}{4}$"
3	591.1		731.2		651.7	
2	639.5	4 Ls 6" x 4" x $\frac{11}{16}$" 1 Web 12" x $\frac{1}{2}$" 2 Covs. 14" x $\frac{13}{16}$"	785.3	4 Ls 6" x 4" x $\frac{11}{16}$" 1 Web 12" x $\frac{11}{16}$" 2 Covs. 14" x 1$\frac{1}{8}$"	700.9	4 Ls 6" x 4" x $\frac{11}{16}$" 1 Web 12" x $\frac{11}{16}$" 2 Covs. 14" x $\frac{15}{16}$"
1	692.5		844.8		755.7	
1 B.	720.0	4 Ls 6" x 4" x $\frac{11}{16}$" 1 Web 12" x $\frac{1}{2}$" 2 Covs. 14" x $\frac{15}{16}$"	892.6	4 Ls 6" x 4" x $\frac{11}{16}$" 1 Web 12" x $\frac{11}{16}$" 2 Covs. 14" x 1$\frac{3}{8}$"	798.0	4 Ls 6" x 4" x $\frac{11}{16}$" 1 Web 12" x $\frac{11}{16}$" 2 Covs. 14" x 1$\frac{1}{8}$"
2 B.	738.0		926.8		828.6	

COLUMN SCHEDULE

Column No. 4			Column No. 5		Column No. 6	
Story	Load	Section	Load	Section	Load	Section
Roof	—		—		—	
16	63.1	4-Ls 6"x4"x3/8" 1-Pl. 12"x3/8"	70.4	4-Ls 6"x4"x3/8" 1-Pl. 12"x3/8"	30.7	4-Ls 4"x3"x5/16" 1-Pl. 12"x5/16"
15	103.3		114.7		68.9	
14	149.2	4-Ls 6"x4"x3/8" 1-Pl. 12"x3/8"	165.6	4-Ls 6"x4"x3/8" 1-Pl. 12"x3/8"	109.9	4-Ls 5"x3 1/2"x5/16" 1-Pl. 12"x5/16"
13	192.2		213.3		149.2	
12	234.6	4-Ls 6"x4"x3/8" 1 Web 12"x3/8" 2-Covs. 14"x5/16"	260.3	4-Ls 6"x4"x3/8" 1 Web 12"x3/8" 2-Covs. 14"x5/16"	188.2	4-Ls 6"x4"x3/8" 1-Pl. 12"x3/8
11	276.5		306.7		226.8	
10	323.5	4-Ls 6x4x11/16 1 Web 12"x5/8" 2 Covs. 14"x3/4"	358.6	4-Ls 6"x4"x11/16" 1 Web 12"x11/16" 2-Covs. 14 x15/16"	271.7	4-Ls 6"x4"x3/8" 1 Web 12"x3/8" 2-Covs. 14"x5/16"
9	550.1		611.0		316.3	
8	572.6	4-Ls 6x4x11/16 1 Web 12"x1/2" 2 Covs. 14"x13/16"	635.5	4-Ls 6"x4"x11/16" 1 Web 12"x11/16" 2 Covs. 14"x15/16"	346.8	4-Ls 6"x4"x7/16" 1 Web 12"x7/16" 2 Covs. 14"x3/8"
7	623.9		691.2		394.2	
6	673.7	4-Ls 6"x4"x11/16" 1 Web 12"x1/2" 2 Covs. 14"x7/8"	745.5	4-Ls 6"x4"x11/16" 1 Web 12"x11/16" 2 Covs. 14"x1"	443.5	4-Ls 6"x4"x1/2" 1 Web 12"x1/2" 2 Covs. 14"x1/2"
5	724.0		800.9		494.7	
4	773.7	4-Ls 6"x4"x11/16" 1 Web 12"x11/16" 2 Covs. 14"x1 1/16"	855.7	4-Ls 6x4"x11/16" 1 Web 12"x11/16" 2 Covs. 14"x1 5/16"	545.6	4-Ls 6"x4"x5/8" 1 Web 12"x1/2" 2 Covs. 14"x5/8"
3	822.9		909.8		596.1	
2	872.1	4-Ls 6"x4"x11/16" 1 Web 12"x11/16" 2 Covs. 14"x1 3/8"	963.9	4-Ls 6"x4"x11/16" 1 Web 12"x11/16" 2 Covs. 15"x1 1/2"	646.6	4-Ls 6"x4"x11/16" 1 Web 12"x1/2" 2 Covs. 14"x13/16"
1	926.9		1023.4		703.9	
1-B	969.2	4-Ls 6"x4"x11/16" 1 Web 12"x11/16" 2 Covs. 15"x1 7/16"	1071.2	4 Ls 6"x6"x11/16" 1 Web 12"x11/16" 2 Covs. 16"x1 7/16"	749.4	4-Ls 6x4x11/16" 1 Web 12x11/16" 2 Covs. 14x15/16"
2-B	999.8		1105.4		767.4	

COLUMN SCHEDULE

Column No. 7			Column No. 8		Column No. 9	
Story	Load		Load		Load	
Roof	—		—		—	
16	53.8	4 Ls 6"x4"x$\frac{3}{8}$" 1 Pl. 12"x$\frac{3}{8}$"	—		—	
15	113.4		—		—	
14	171.1	4 Ls 6"x4"x$\frac{3}{8}$" 1 Pl. 12"x$\frac{3}{8}$"	70.4	4 Ls 5"x3$\frac{1}{2}$"x$\frac{5}{16}$" 1 Pl. 12"x$\frac{5}{16}$"	63.0	4 Ls 5"x3$\frac{1}{2}$"x$\frac{5}{16}$" 1 Pl. 12"x$\frac{5}{16}$"
13	225.1		133.8		119.8	
12	278.4	4 Ls 6x4"x$\frac{3}{8}$" 1 Web 12"x$\frac{3}{8}$" 2 Covs. 14"x$\frac{5}{16}$"	195.9	4 Ls 6"x4"x$\frac{7}{16}$" 1 Pl. 12"x$\frac{7}{16}$"	175.4	4 Ls 6"x4"x$\frac{3}{8}$" 1 Pl. 12"x$\frac{3}{8}$"
11	330.9		256.6		229.7	
10	389.5	4 Ls 6x4"x$\frac{1}{2}$" 1 Web 12"x$\frac{1}{2}$" 2 Covs. 14"x$\frac{7}{16}$"	315.9	4 Ls 6"x4"x$\frac{3}{8}$" 1 Web 12"x$\frac{3}{8}$" 2 Covs. 14"x$\frac{3}{8}$"	282.8	4 Ls 6"x4"x$\frac{3}{8}$" 1 Web 12"x$\frac{7}{16}$" 2 Covs. 14"x$\frac{5}{16}$"
9	447.4		373.8		334.6	
8	404.5	4 Ls 6"x4"x$\frac{5}{8}$" 1 Web 12"x$\frac{1}{2}$" 2 Covs. 14"x$\frac{9}{16}$"	430.3	4 Ls 6"x4"x$\frac{1}{2}$" 1 Web 12"x$\frac{1}{2}$" 2 Covs. 14"x$\frac{1}{2}$"	361.4	4 Ls 6"x4"x$\frac{7}{16}$" 1 Web 12"x$\frac{7}{16}$" 2 Covs. 14"x$\frac{7}{16}$"
7	565.8		494.7		420.5	
6	627.4	4 Ls 6"x4"x$\frac{11}{16}$" 1 Web 12"x$\frac{1}{2}$" 2 Covs. 14"x$\frac{13}{16}$"	548.4	4 Ls 6"x4"x$\frac{5}{8}$" 1 Web 12"x$\frac{1}{2}$" 2 Covs. 14"x$\frac{5}{8}$"	468.6	4 Ls 6"x4"x$\frac{9}{16}$" 1 Web 12"x$\frac{1}{2}$" 2 Covs. 14"x$\frac{1}{2}$"
5	689.3		600.8		515.4	
4	750.4	4 Ls 6"x4"x$\frac{11}{16}$" 1 Web 12"x$\frac{11}{16}$" 2 Covs. 14"x1$\frac{1}{16}$"	651.8	4 Ls 6"x4"x$\frac{11}{16}$" 1 Web 12"x$\frac{1}{2}$" 2 Covs. 14"x$\frac{13}{16}$"	561.0	4 Ls 6"x4"x$\frac{11}{16}$" 1 Web 12"x$\frac{1}{2}$" 2 Covs. 14"x$\frac{5}{8}$"
3	811.5		702.8		606.6	
2	872.6	4 Ls 6"x4"x$\frac{11}{16}$" 1 Web 12"x$\frac{11}{16}$" 2 Covs. 14"x1$\frac{3}{8}$"	753.8	4 Ls 6"x4"x$\frac{11}{16}$" 1 Web 12"x$\frac{11}{16}$" 2 Covs. 14"x1"	652.2	4 Ls 6"x4"x$\frac{11}{16}$" 1 Web 12"x$\frac{1}{2}$" 2 Covs. 14"x$\frac{13}{16}$"
1	941.3		804.8		697.8	
1B.	995.6	4 Ls 6"x4"x$\frac{11}{16}$" 1 Web 12"x$\frac{11}{16}$" 2 Covs. 15"x1$\frac{1}{2}$"	897.4	4 Ls 6"x4"x$\frac{11}{16}$" 1 Web 12"x$\frac{11}{16}$" 2 Covs. 14"x1$\frac{1}{2}$"	780.7	4 Ls 6"x4"x$\frac{11}{16}$" 1 Web 12"x$\frac{11}{16}$" 2 Covs. 14"x1$\frac{3}{16}$"
2B.	1034.6		990.0		863.6	

COLUMN SCHEDULE

	Column No. 10		Column No. 11		Column No. 12	
Story	Load	Section	Load	Section	Load	Section
Roof	—		—		—	
16	—		—		28.5	4 Ls 6"×4"×3/8" 1 Pl. 12"×3/8"
15	—		—		75.9	
14	63.0	4-Ls 4"×3"×5/16" 1-Pl. 12"×5/16"	70.4	4-Ls 4"×3"×5/16" 1-Pl. 12"×5/16"	139.9	4 Ls 6"×4"×3/8" 1 Pl. 12"×3/8"
13	119.8	4-Ls 5"×3½"×3/8" 1-Pl. 12"×3/8"	133.8	4-Ls 6"×4"×3/8" 1-Pl. 12"×3/8"	200.2	
12	175.4		195.9		259.8	4 Ls 6"×4"×3/8" 1 Web 12"×3/8" 2 Covs. 14"×5/16"
11	229.7	4-Ls 6"×4"×3/8" 1-Web 12"×3/8" 2-Covs. 14"×5/16"	256.6	4-Ls 6"×4"×3/8" 1-Web 12"×3/8" 2-Covs. 14"×5/16"	318.6	
10	282.8		313.9		285.7	4 Ls 6"×4"×5/8" 1 Web 12"×½" 2 Covs. 14"×9/16"
9	—	GIRDER	—	GIRDER	452.1	
8	—		—		488.0	4 Ls 6"×4"×5/8" 1 Web 12"×½" 2 Covs. 14"×9/16"
7	71.3	4-Ls 4"×3"×5/16" 1-Pl. 12"×5/16"	79.6	4-Ls 4"×3"×5/16" 1-Pl. 12"×5/16"	560.6	
6	128.1	4-Ls 5"×3½"×3/8" 1-Pl. 12"×3/8"	143.0	4-Ls 6"×4"×3/8" 1-Pl. 12"×3/8"	631.4	4 Ls 6"×4"×11/16" 1 Web 12"×½" 2 Covs. 14"×13/16"
5	183.7		205.1		704.6	
4	238.0	4-Ls 6"×4"×3/8" 1-Web 12"×3/8" 2-Covs. 14"×5/16"	265.8	4-Ls 6"×4"×3/8" 1-Web 12"×3/8" 2-Covs. 14"×5/16"	777.1	4 Ls 6"×4"×11/16" 1 Web 12"×11/16" 2 Covs. 14"×1⅛"
3	291.1		325.1		848.8	
2	342.9	4-Ls 6"×4"×7/16" 1-Web 12"×7/16" 2-Covs. 14"×3/8"	383.0	4-Ls 6"×4"×½" 1-Web 12"×½" 2-Covs. 14"×7/16"	920.5	4 Ls 6"×4"×11/16" 1 Web 12"×11/16" 2 Covs. 15"×1 7/16"
1	393.3		439.5		999.6	
1-B	476.2	4-Ls 6"×4"×5/8" 1-Web 12"×½" 2-Covs. 14"×9/16"	532.1	4-Ls 6"×4"×11/16" 1-Web 12"×½" 2-Covs. 14"×5/8"	1108.1	4 Ls 6"×6"×11/16" 1 Web 12"×11/16" 2 Covs. 16"×1½"
2-B	559.1		624.7		1147.1	

COLUMN SCHEDULE

	Column No. 13		Column No. 14		Column No. 15	
Story	Load		Load		Load	
Roof			9.0	4 Ls 4" x 3" x $\frac{5}{16}$" 1 Pl. 12" x $\frac{5}{16}$"	17.0	4 Ls 4" x 3" x $\frac{5}{16}$" 1 Pl. 12" x $\frac{5}{16}$"
16	56.6	4 Ls 4" x 3" x $\frac{5}{16}$" 1 Pl. 12" x $\frac{5}{16}$"	85.8	4 Ls 6" x 4" x $\frac{3}{8}$" 1 Pl. 12" x $\frac{3}{8}$"	103.3	4 Ls 4" x 3" x $\frac{5}{16}$" 1 Pl. 12" x $\frac{5}{16}$"
15	93.6		85.8		121.2	
14	153.4	4 Ls 6" x 4" x $\frac{3}{8}$" 1 Pl. 12" x $\frac{3}{8}$"	154.0	4 Ls 6" x 4" x $\frac{3}{8}$" 1 Pl. 12" x $\frac{3}{8}$"	180.2	4 Ls 6" x 4" x $\frac{3}{8}$" 1 Pl. 12" x $\frac{3}{8}$"
13	209.3		220.7		234.1	
12	264.5	4 Ls 6" x 4" x $\frac{3}{8}$" 1 Web 12" x $\frac{3}{8}$" 2 Covs. 14" x $\frac{5}{16}$"	285.9	4 Ls 6" x 4" x $\frac{3}{8}$" 1 Web 12" x $\frac{3}{8}$" 2 Covs. 14" x $\frac{5}{16}$"	286.7	4 Ls 6" x 4" x $\frac{3}{8}$" 1 Web 12" x $\frac{3}{8}$" 2 Covs. 14" x $\frac{5}{16}$"
11	318.9		349.7		342.5	
10	379.5	4 Ls 6" x 4" x $\frac{7}{16}$" 1 Web 12" x $\frac{7}{16}$" 2 Covs. 14" x $\frac{7}{16}$"	412.0	4 Ls 6" x 4" x $\frac{1}{2}$" 1 Web 12" x $\frac{1}{2}$" 2 Covs. 14" x $\frac{7}{16}$"	396.9	4 Ls 6 x 4" x $\frac{1}{2}$" 1 Web 12" x $\frac{1}{2}$" 2 Covs. 14" x $\frac{7}{16}$"
9	439.3		472.9		450.1	
8	498.4	4 Ls 6" x 4" x $\frac{5}{8}$" 1 Web 12" x $\frac{1}{2}$" 2 Covs. 14" x $\frac{9}{16}$"	532.3	4 Ls 6" x 4" x $\frac{5}{8}$" 1 Web 12" x $\frac{1}{2}$" 2 Covs. 14" x $\frac{5}{8}$"	489.4	4 Ls 6" x 4" x $\frac{5}{8}$" 1 Web 12" x $\frac{1}{2}$" 2 Covs. 14" x $\frac{9}{16}$"
7	561.8		600.0		551.0	
6	625.6	4 Ls 6" x 4" x $\frac{11}{16}$" 1 Web 12" x $\frac{1}{2}$" 2 Covs. 14" x $\frac{13}{16}$"	656.5	4 Ls 6" x 4" x $\frac{11}{16}$" 1 Web 12" x $\frac{1}{2}$" 2 Covs. 14" x $\frac{7}{8}$"	573.2	4 Ls 6" x 4" x $\frac{5}{8}$" 1 Web 12" x $\frac{1}{2}$" 2 Covs. 14" x $\frac{9}{16}$"
5	689.3		711.5		600.2	
4	752.2	4 Ls 6" x 4" x $\frac{11}{16}$" 1 Web 12" x $\frac{11}{16}$" 2 Covs. 14" x $1\frac{1}{16}$"	765.1	4 Ls 6" x 4" x $\frac{11}{16}$" 1 Web 12" x $\frac{11}{16}$" 2 Covs. 14" x $1\frac{1}{16}$"	696.0	4 Ls 6" x 4" x $\frac{11}{16}$" 1 Web 12" x $\frac{1}{2}$" 2 Covs. 14" x $\frac{15}{16}$"
3	815.1		818.7		743.9	
2	878.0	4 Ls 6" x 4" x $\frac{11}{16}$" 1 Web 12" x $\frac{11}{16}$" 2 Covs. 14" x $1\frac{7}{16}$"	872.3	4 Ls 6" x 4" x $\frac{11}{16}$" 1 Web 12" x $\frac{11}{16}$" 2 Covs. 14" x $1\frac{3}{8}$"	791.8	4 Ls 6" x 4" x $\frac{11}{16}$" 1 Web 12" x $\frac{11}{16}$" 2 Covs. 14" x $1\frac{1}{8}$"
1	948.8		925.9		839.7	
1-B	1006.1	4 Ls 6" x 4" x $\frac{11}{16}$" 1 Web 12" x $\frac{11}{16}$" 2 Covs. 16" x $1\frac{7}{16}$"	1023.3	4 Ls 6" x 6" x $\frac{11}{16}$" 1 Web 12" x $\frac{11}{16}$" 2 Covs. 16" x $1\frac{7}{16}$"	926.9	4 Ls 6" x 4" x $\frac{11}{16}$" 1 Web 12" x $\frac{11}{16}$" 2 Covs. 15" x $1\frac{7}{16}$"
2-B	1047.1		1120.7		996.6	

COLUMN SCHEDULE

Column No. 16			Column No. 17		Column No 18	
Story	Load		Load		Load	
Roof	8.0	4 Ls 4"x3"x$\frac{5}{16}$" 1 Pl. 12"x$\frac{5}{16}$"			—	
16	194.3	4 Ls 6"x4"x$\frac{7}{16}$" 1 Pl. 12"x$\frac{7}{16}$"	64.4	4 Ls 6"x4"x$\frac{3}{8}$" 1 Pl. 12"x$\frac{3}{8}$"	19.9	4 Ls 4"x3"x$\frac{5}{16}$" 1 Pl. 12"x$\frac{5}{16}$"
15	236.1		108.7		62.7	
14	283.2	4 Ls 6"x4"x$\frac{3}{8}$" 1 Web 12"x$\frac{3}{8}$" 2 Covs. 14"x$\frac{5}{16}$"	159.6	4 Ls 6"x4"x$\frac{3}{8}$" 1 Pl. 12"x$\frac{3}{8}$"	107.6	4 Ls 5"x3$\frac{1}{2}$"x$\frac{5}{16}$" 1 Pl. 12"x$\frac{5}{16}$"
13	329.3		207.3		150.5	
12	374.4	4 Ls 6"x4"x$\frac{7}{16}$" 1 Web 12"x$\frac{7}{16}$" 2 Covs. 14"x$\frac{7}{16}$"	254.3	4 Ls 6"x4"x$\frac{3}{8}$" 1 Web 12"x$\frac{3}{8}$" 2 Covs. 14"x$\frac{5}{16}$"	193.0	4 Ls 6"x4"x$\frac{3}{8}$" 1 Pl. 12"x$\frac{3}{8}$"
11	434.6		300.7		235.1	
10	500.1	4 Ls 6"x4"x$\frac{11}{16}$" 1 Web 12"x$\frac{1}{2}$" 2 Covs. 14"x$\frac{7}{8}$"	329.5	4 Ls 6"x4"x$\frac{11}{16}$" 1 Web 12"x$\frac{1}{2}$" 2 Covs. 14"x$\frac{7}{8}$"	285.1	4 Ls 6"x4"x$\frac{3}{8}$" 1 Web 12"x$\frac{3}{8}$" 2 Covs. 14"x$\frac{5}{16}$"
9	718.3		581.7		334.7	
8	754.9	4 Ls 6"x4"x$\frac{11}{16}$" 1 Web 12"x$\frac{11}{16}$" 2 Covs. 14"x1$\frac{1}{16}$"	605.2	4 Ls 6"x4"x$\frac{11}{16}$" 1 Web 12"x$\frac{11}{16}$" 2 Covs. 14"x$\frac{7}{8}$"	366.9	4 Ls 6"x4"x$\frac{7}{16}$" 1 Web 12"x$\frac{7}{16}$" 2 Covs. 14"x$\frac{7}{16}$"
7	823.9		660.9		419.8	
6	891.3	4 Ls 6"x4"x$\frac{11}{16}$" 1 Web 12"x$\frac{11}{16}$" 2 Covs. 14"x1$\frac{7}{16}$"	715.2	4 Ls 6"x4"x$\frac{11}{16}$" 1 Web 12"x$\frac{11}{16}$" 2 Covs. 14"x$\frac{7}{8}$"	474.9	4 Ls 6"x4"x$\frac{9}{16}$" 1 Web 12"x$\frac{1}{2}$" 2 Covs. 14"x$\frac{9}{16}$"
5	958.2		770.6		531.6	
4	1025.1	4 Ls 6"x6"x$\frac{11}{16}$" 1 Web 12"x$\frac{11}{16}$" 2 Covs. 16"x1$\frac{3}{8}$"	825.4	4 Ls 6"x4"x$\frac{11}{16}$" 1 Web 12"x$\frac{11}{16}$" 2 Covs. 14"x1$\frac{1}{4}$"	589.7	4 Ls 6"x4"x$\frac{11}{16}$" 1 Web 12"x$\frac{1}{2}$" 2 Covs. 14"x$\frac{11}{16}$"
3	1092.0		879.5		643.8	
2	1162.5	4 Ls 8"x6"x$\frac{11}{16}$" 1 Web 12"x$\frac{11}{16}$" 2 Covs. 18"x1$\frac{1}{4}$"	941.2	4 Ls 6"x4"x$\frac{11}{16}$" 1 Web 12"x$\frac{11}{16}$" 2 Covs. 15"x1$\frac{1}{4}$"	706.8	4 Ls 6"x4"x$\frac{11}{16}$" 1 Web 12"x$\frac{11}{16}$" 2 Covs. 14"x$\frac{15}{16}$"
1	1210.5		1019.3		762.3	
1-B	1297.8	4 Ls 8"x6"x$\frac{11}{16}$" 1 Web 12"x$\frac{11}{16}$" 2 Covs. 18"x1$\frac{5}{8}$"	1088.4	4 Ls 6"x6"x$\frac{11}{16}$" 1 Web 12"x$\frac{11}{16}$" 2 Covs. 16"x1$\frac{3}{8}$"	846.7	4 Ls 6"x4"x$\frac{11}{16}$" 1 Web 12"x$\frac{11}{16}$" 2 Covs. 14"x1$\frac{1}{4}$"
2-B	1376.6		1113.1		887.7	

COLUMN SCHEDULE

	Column No. 19		Column No. 20		Column No. 21	
Story	Load		Load		Load	
Roof	—		17.1	4 Ls 4"x3"x$\frac{5}{16}$" 1 Pl. 12"x$\frac{5}{16}$"	32.3	4 Ls 4"x3"x$\frac{5}{16}$" 1 Pl. 12"x$\frac{5}{16}$"
16	52.5	4 Ls 4"x3"x$\frac{5}{16}$" 1 Pl. 12"x$\frac{5}{16}$"	91.7	4 Ls 5"x3$\frac{1}{2}$"x$\frac{5}{16}$" 1 Pl. 12"x$\frac{5}{16}$"	116.4	4 Ls 5"x3$\frac{1}{2}$"x$\frac{3}{8}$" 1 Pl. 12"x$\frac{3}{8}$"
15	94.3		154.9		163.9	
14	147.2	4 Ls 6x4"x$\frac{3}{8}$" 1 Pl. 12"x$\frac{3}{8}$"	216.7	4 Ls 6"x4"x$\frac{3}{8}$" 1 Web 12"x$\frac{3}{8}$" 2 Covs. 14"x$\frac{5}{16}$"	214.7	4 Ls 6"x4"x$\frac{7}{16}$" 1 Pl. 12"x$\frac{7}{16}$"
13	198.7		277.2		264.3	
12	247.6	4 Ls 6"x4"x$\frac{3}{8}$" 1 Web 12"x$\frac{3}{8}$" 2 Covs. 14"x$\frac{5}{16}$"	336.4	4 Ls 6"x4"x$\frac{7}{16}$" 1 Web 12"x$\frac{7}{16}$" 2 Covs. 14"x$\frac{3}{8}$"	312.6	4 Ls 6"x4"x$\frac{3}{8}$" 1 Web 12"x$\frac{3}{8}$" 2 Covs. 12"x$\frac{3}{8}$"
11	297.2		394.2		364.3	
10	351.9	4 Ls 6"x4"x$\frac{7}{16}$" 1 Web 12"x$\frac{7}{16}$" 2 Covs. 14"x$\frac{3}{8}$"	450.6	4 Ls 6"x4"x$\frac{9}{16}$" 1 Web 12"x$\frac{1}{2}$" 2 Covs. 14"x$\frac{1}{2}$"	414.8	4 Ls 6"x4"x$\frac{1}{2}$" 1 Web 12"x$\frac{1}{2}$" 2 Covs. 14"x$\frac{7}{16}$"
9	405.9		505.7		464.1	
8	459.2	4 Ls 6"x4"x$\frac{9}{16}$" 1 Web 12"x$\frac{1}{2}$" 2 Covs. 14"x$\frac{1}{2}$"	559.5	4 Ls 6"x4"x$\frac{11}{16}$" 1 Web 12"x$\frac{1}{2}$" 2 Covs. 14"x$\frac{5}{8}$"	512.1	4 Ls 6"x4"x$\frac{5}{8}$" 1 Web 12"x$\frac{1}{2}$" 2 Covs. 14"x$\frac{9}{16}$"
7	516.8		620.9		566.9	
6	574.4	4 Ls 6"x4"x$\frac{11}{16}$" 1 Web 12"x$\frac{1}{2}$" 2 Covs. 14"x$\frac{11}{16}$"	671.9	4 Ls 6"x4"x$\frac{11}{16}$" 1 Web 12"x$\frac{1}{2}$" 2 Covs. 14"x$\frac{7}{8}$"	612.6	4 Ls 6"x4"x$\frac{11}{16}$" 1 Web 12"x$\frac{1}{2}$" 2 Covs. 14"x$\frac{11}{16}$"
5	631.9		721.6		657.0	
4	688.4	4 Ls 6"x4"x$\frac{11}{16}$" 1 Web 12"x$\frac{1}{2}$" 2 Covs. 14"x$\frac{15}{16}$"	771.3	4 Ls 6"x4"x$\frac{11}{16}$" 1 Web 12"x$\frac{11}{16}$" 2 Covs. 14"x1$\frac{1}{16}$"	701.4	4 Ls 6"x4"x$\frac{11}{16}$" 1 Web 12"x$\frac{1}{2}$" 2 Covs. 14"x$\frac{15}{16}$"
3	746.9		821.0		745.8	
2	804.9	4 Ls 6"x4"x$\frac{11}{16}$" 1 Web 12"x$\frac{11}{16}$" 2 Covs. 14"x1$\frac{1}{8}$"	870.7	4 Ls 6"x4"x$\frac{11}{16}$" 1 Web 12"x$\frac{11}{16}$" 2 Covs. 14"x1$\frac{5}{16}$"	790.2	4 Ls 6"x4"x$\frac{11}{16}$" 1 Web 12"x$\frac{11}{16}$" 2 Covs. 14"x1$\frac{1}{16}$"
1	853.6		912.5		827.6	
1-B	906.1	4 Ls 6"x4"x$\frac{11}{16}$" 1 Web 12"x$\frac{11}{16}$" 2 Covs. 14"x1$\frac{3}{8}$"	1002.8	4 Ls 6"x4"x$\frac{11}{16}$" 1 Web 12"x$\frac{11}{16}$" 2 Covs. 16"x1$\frac{1}{2}$"	908.4	4 Ls 6"x4"x$\frac{11}{16}$" 1 Web 12"x$\frac{11}{16}$" 2 Covs 14"x1$\frac{1}{2}$"
2-B	944.1		1075.0		978.1	

COLUMN SCHEDULE

Column No. 22			Column No. 23		Column No. 24	
Story	Load	Section	Load	Section	Load	Section
Roof	152	4 Ls 4"x3"x$\frac{5}{16}$" 1 Pl. 12"x$\frac{5}{16}$"				
16	192.5	4 Ls 6"x4"x$\frac{3}{8}$" 1 Pl. 12"x$\frac{3}{8}$"				
15	229.0					
14	257.8	4 Ls 6"x4"x$\frac{3}{8}$" 1 Web 12"x$\frac{3}{8}$" 2 Covs. 14"x$\frac{5}{16}$"				
13	286.0					
12	313.6	4 Ls 6"x4"x$\frac{3}{8}$" 1 Web 12"x$\frac{3}{8}$" 2 Covs. 14"x$\frac{5}{16}$"				
11	356.7					
10	404.6	4 Ls 6"x4"x$\frac{1}{2}$" 1 Web 12"x$\frac{1}{2}$" 2 Covs. 14"x$\frac{7}{16}$"				
9	453.6					
8	501.6	4 Ls 6"x4"x$\frac{5}{8}$" 1 Web 12"x$\frac{1}{2}$" 2 Covs. 14"x$\frac{9}{16}$"				
7	552.2					
6	604.5	4 Ls 6x4"x$\frac{11}{16}$" 1 Web 12"x$\frac{1}{2}$" 2 Covs. 14"x$\frac{11}{16}$"				
5	657.7					
4	708.9	4 Ls 6"x4"x$\frac{11}{16}$" 1 Web 12"x$\frac{11}{16}$" 2 Covs. 14"x$\frac{15}{16}$"				
3	760.1					
2	819.1	4 Ls 6"x4"x$\frac{11}{16}$" 1 Web 12"x$\frac{11}{16}$" 2 Covs. 14"x1$\frac{3}{16}$"	14.5	4 Ls 4"x3"x$\frac{5}{16}$" 1 Pl. 12"x$\frac{5}{16}$"	7.6	4 Ls 4x3x$\frac{5}{16}$ 1 Pl. 12x$\frac{5}{16}$
1	857.5		76.2		71.1	
1-B.	938.2	4 Ls 6"x4"x$\frac{11}{16}$" 1 Web 12"x$\frac{11}{16}$" 2 Covs. 15"x1$\frac{7}{16}$"	166.5	4 Ls 6"x4"x$\frac{7}{16}$" 1 Pl. 12"x$\frac{7}{16}$"	153.1	4 Ls 5"x3$\frac{1}{2}$"x$\frac{3}{8}$" 1 Pl. 12"x$\frac{3}{8}$"
2-B.	1002.9		238.7		191.1	

COLUMN SCHEDULE

	Column No. 25		Column No. 26		Column No. 27	
Story	Load	Section	Load	Section	Load	Section
Roof	—		8.1	4 Ls 4" x 3" x 5/16" 1 Pl. 12" x 5/16"	15.3	4 Ls 4" x 3" x 5/16" 1 Pl. 12" x 5/16"
16	49.7	4 Ls 4" x 3" x 5/16" 1 Pl. 12" x 5/16"	77.5	4 Ls 5" x 3 1/2" x 5/16" 1 Pl. 12" x 5/16"	80.0	4 Ls 5 x 3 1/2 x 5/16" 1 Pl. 12" x 5/16"
15	104.7		137.4		133.6	
14	154.4	4 Ls 6" x 4" x 3/8" 1 Pl. 12" x 3/8"	196.0	4 Ls 6 x 4 x 7/16 1 Pl. 12 x 7/16	186.0	4 Ls 6" x 4" x 7/16" 1 Pl. 12" x 7/16"
13	203.5		253.3		237.3	
12	251.9	4 Ls 6" x 4" x 3/8" 1 Web 12" x 3/8" 2 Covs. 14" x 5/16"	309.3	4 Ls 6" x 4" x 3/8" 1 Web 12" x 3/8" 2 Covs. 14" x 3/8"	287.6	4 Ls 6" x 4" x 3/8" 1 Web 12" x 3/8" 2 Covs. 14" x 5/16"
11	299.6		364.0		336.3	
10	352.9	4 Ls 6" x 4" x 7/16" 1 Web 12" x 7/16" 2 Covs. 14" x 3/8"	417.4	4 Ls 6" x 4" x 1/2" 1 Web 12" x 1/2" 2 Covs. 14" x 7/16"	384.1	4 Ls 6 x 4 x 7/16 1 Web 12 x 7/16 2 Covs. 14 x 7/16
9	405.6		469.6		430.8	
8	457.6	4 Ls 6" x 4" x 9/16" 1 Web 12" x 1/2" 2 Covs. 14" x 1/2"	520.5	4 Ls 6" x 4" x 5/8" 1 Web 12" x 1/2" 2 Covs. 14" x 9/16"	476.3	4 Ls 6" x 4" x 9/16" 1 Web 12" x 1/2" 2 Covs. 14" x 9/16"
7	513.4		578.7		528.3	
6	569.5	4 Ls 6" x 4" x 11/16" 1 Web 12" x 1/2" 2 Covs. 14" x 5/8"	627.0	4 Ls 6" x 4" x 11/16" 1 Web 12" x 1/2" 2 Covs. 14" x 3/4"	571.5	4 Ls 6" x 4" x 11/16" 1 Web 12" x 5/8" 2 Covs. 14" x 1/2"
5	625.7		674.0		613.6	
4	681.9	4 Ls 6" x 4" x 11/16" 1 Web 12" x 1/2" 2 Covs. 14" x 15/16"	721.0	4 Ls 6" x 4" x 11/16" 1 Web 12" x 11/16" 2 Covs. 14" x 15/16"	655.7	4 Ls 6" x 4" x 11/16" 1 Web 12" x 1/2" 2 Covs. 14" x 13/16"
3	738.1		768.0		697.8	
2	794.3	4 Ls 6" x 6" x 11/16" 1 Web 12" x 11/16" 2 Covs. 16" x 1 3/8"	815.0	4 Ls 6" x 6" x 11/16" 1 Web 12" x 11/16" 2 Covs. 16" x 1 7/16"	739.9	4 Ls 6" x 4" x 11/16" 1 Web 12" x 11/16" 2 Covs. 16" x 1 3/8"
1	852.1		815.0		739.9	
1-B.	901.6	4 Ls 6" x 6" x 11/16" 1 Web 12" x 11/16" 2 Covs. 16" x 1 3/8"	900.5	4 Ls 6" x 6" x 11/16" 1 Web 12" x 11/16" 2 Covs. 16" x 1 7/16"	816.9	4 Ls 6" x 6" x 11/16" 1 Web 12" x 11/16" 2 Covs. 16" x 1 3/8"
2-B.	937.6		986.0		892.9	

COLUMN SCHEDULE

Column No. 28			Column No. 29		Column No. 30	
Story	Load	Section	Load	Section	Load	Section
Roof	7.2	4 Ls 4"x3"x5/16" 1 Pl. 12"x5/16"	9.0	4 Ls 4"x3"x5/16" 1 Pl. 12"x5/16"	9.0	4 Ls 4"x3"x5/16" 1 Pl. 12"x5/16"
16	60.2	4 Ls 4"x3"x5/16" 1 Pl. 12"x5/16"	46.7	4 Ls 4"x3"x5/16" 1 Pl. 12"x5/16"	63.9	4 Ls 4"x3"x5/16" 1 Pl. 12"x5/16"
15	107.5		102.0		101.4	
14	165.1	4 Ls 6"x4"x3/8" 1 Pl. 12"x3/8"	150.2	4 Ls 5"x3 1/2"x3/8" 1 Pl. 12"x3/8"	141.8	4 Ls 5"x3 1/2"x5/16" 1 Pl. 12"x5/16"
13	221.7		186.9		177.9	
12	277.4	4 Ls 6"x4"x3/8" 1 Web 12"x3/8" 2 Covs. 14"x5/16"	243.8	4 Ls 6"x4"x3/8" 1 Web 12"x3/8" 2 Covs. 14"x5/16"	217.6	4 Ls 6"x4"x7/16" 1 Pl. 12"x7/16"
11	332.3		290.0		255.9	
10	392.6	4 Ls 6"x4"x1/2" 1 Web 12"x1/2" 2 Covs. 14"x7/16"	342.5	4 Ls 6"x4"x7/16" 1 Web 12"x7/16" 2 Covs. 14"x3/8"	304.5	4 Ls 6"x4"x3/8" 1 Web 12"x3/8" 2 Covs. 14"x5/16"
9	452.1		393.6		349.7	
8	509.9	4 Ls 6"x4"x5/8" 1 Web 12"x1/2" 2 Covs. 14"x9/16"	444.9	4 Ls 6"x4"x9/16" 1 Web 12"x1/2" 2 Covs. 14"x1/2"	396.6	4 Ls 6"x4"x1/2" 1 Web 12"x1/2" 2 Covs. 14"x7/16"
7	573.4		499.0		442.4	
6	635.9	4 Ls 6"x4"x11/16" 1 Web 12"x1/2" 2 Covs. 14"x13/16"	554.8	4 Ls 6"x4"x11/16" 1 Web 12"x1/2" 2 Covs. 14"x5/8"	495.1	4 Ls 6"x4"x9/16" 1 Web 12"x9/16" 2 Covs. 14"x1/2"
5	698.3		609.6		545.6	
4	760.7	4 Ls 6"x4"x11/16" 1 Web 12"x11/16" 2 Covs. 14"x1 1/16"	665.2	4 Ls 6"x4"x11/16" 1 Web 12"x1/2" 2 Covs. 14"x7/8"	600.1	4 Ls 6"x4"x11/16" 1 Web 12"x1/2" 2 Covs. 14"x11/16"
3	823.1		720.0		650.6	
2	889.2	4 Ls 8"x6"x11/16" 1 Web 12"x11/16" 2 Covs. 18"x1 1/4"	782.5	4 Ls 6"x4"x11/16" 1 Web 12"x11/16" 2 Covs. 14"x1 1/16"	708.7	4 Ls 6"x4"x11/16" 1 Web 12"x11/16" 2 Covs. 14"x15/16"
1	889.2		822.1		780.4	
1-B.	965.7	4 Ls 8"x6"x11/16" 1 Web 12"x11/16" 2 Covs. 18"x1 1/4"	908.5	4 Ls 6x4"x11/16" 1 Web 12"x11/16" 2 Covs. 14"x1 1/2"	852.4	4 Ls 6x4"x11/16" 1 Web 12"x11/16" 2 Covs. 14"x1 1/4"
2-B.	1026.9		976.9		888.7	

COLUMN SCHEDULE

Column No. 31			Column No. 32		Column No. 33	
Story	Load	Section	Load	Section	Load	Section
Roof	—		—		—	
16	24.9	4 Ls 4"x3"x 5/16" 1 Pl. 12"x 5/16"	25.9	4 Ls 4"x 3"x 5/16" 1 Pl. 12"x 5/16"	23.1	4 Ls 4"x 3"x 5/16" 1 Pl. 12"x 5/16"
15	62.6		80.6		72.2	
14	98.6	4 Ls 5"x3 1/2"x 5/16" 1 Pl. 12"x 5/16"	128.3	4 Ls 5"x 3 1/2"x 5/16" 1 Pl. 12"x 5/16"	115.2	4 Ls 5"x 3 1/2"x 5/16" 1 Pl. 12"x 5/16"
13	134.3		175.3		157.6	
12	169.6	4 Ls 6"x4"x 3/8" 1 Pl. 12"x 3/8"	221.7	4 Ls 6"x4"x 7/16" 1 Pl. 12"x 7/16"	199.5	4 Ls 6"x4"x 7/16" 1 Pl. 12"x 7/16"
11	204.6		267.5		240.8	
10	246.0	4 Ls 6"x4"x 3/8" 1 Web 12"x 3/8" 2 Covs. 14"x 5/16"	318.7	4 Ls 6"x4"x 3/8" 1 Web 12"x 3/8" 2 Covs. 14"x 3/8"	287.2	4 Ls 6"x4"x 3/8" 1 Web 12"x 3/8" 2 Covs. 14"x 15/16"
9	287.0		369.3		333.0	
8	327.7	4 Ls 6"x4"x 3/8" 1 Web 12"x 3/8" 2 Covs. 14"x 5/16"	419.3	4 Ls 6"x4"x 1/2" 1 Web 12"x 1/2" 2 Covs. 14"x 7/16"	378.3	4 Ls 6"x4"x 7/16" 1 Web 12"x 7/16" 2 Covs. 14"x 7/16"
7	330.3		472.9		426.8	
6	415.9	4 Ls 6"x4"x 1/2" 1 Web 12"x 1/2" 2 Covs. 14"x 7/16"	525.9	4 Ls 6"x 4"x 5/8" 1 Web 12"x 1/2" 2 Covs. 14"x 9/16"	475.4	4 Ls 6"x4"x 9/16" 1 Web 12"x 1/2" 2 Covs. 14"x 1/2"
5	462.7		580.0		524.6	
4	509.5	4 Ls 6"x4"x 5/8" 1 Web 12"x 1/2" 2 Covs. 14"x 9/16"	634.1	4 Ls 6"x 4"x 11/16" 1 Web 12"x 1/2" 2 Covs. 14"x 13/16"	573.8	4 Ls 6"x4"x 11/16" 1 Web 12"x 1/2" 2 Covs. 14"x 5/8"
3	556.3		688.2		623.0	
2	603.1	4 Ls 6"x4"x 11/16" 1 Web 12"x 1/2" 2 Covs. 14"x 11/16"	742.3	4 Ls 6"x 4"x 11/16" 1 Web 12"x 11/16" 2 Covs. 16"x 1 3/8"	672.2	4 Ls 6"x4"x 11/16" 1 Web 12"x 11/16" 2 Covs. 15"x 1 5/16"
1	655.1		794.0		719.9	
1-B.	704.3	4 Ls 6"x4"x 11/16" 1 Web 12"x 1/2" 2 Covs. 14"x 13/16"	878.2	4 Ls 6"x4"x 11/16" 1 Web 12"x 11/16" 2 Covs. 16"x 1 3/8"	797.5	4 Ls 6x4"x 11/16" 1 Web 12"x 11/16" 2 Covs. 15"x 1 5/16"
2-B.	722.3		912.4		828.1	

COLUMN SCHEDULE

Column No.34			Column No.35		Column No.36	
Story	Load	Section	Load	Section	Load	Section
Roof			9.0	4 Ls 4" x 3" x $\frac{5}{16}$" 1 Pl. 12" x $\frac{5}{16}$"	9.0	4 Ls 4" x 3" x $\frac{5}{16}$" 1 Pl. 12" x $\frac{5}{16}$"
16	23.1	4 Ls 4" x 3" x $\frac{5}{16}$" 1 Pl. 12" x $\frac{5}{16}$"	48.2	4 Ls 4" x 3" x $\frac{5}{16}$" 1 Pl. 12" x $\frac{5}{16}$"	121.7	4 Ls 5 x $3\frac{1}{2}$ x $\frac{5}{16}$ 1 Pl. 12 x $\frac{5}{16}$
15	72.2		103.3		152.0	
14	115.2	4 Ls 5" x $3\frac{1}{2}$" x $\frac{5}{16}$" 1 Pl. 12" x $\frac{5}{16}$"	150.5	4 Ls 5" x $3\frac{1}{2}$" x $\frac{3}{8}$" 1 Pl. 12" x $\frac{3}{8}$"	181.2	4 Ls 6" x 4" x $\frac{3}{8}$" 1 Pl. 12" x $\frac{3}{8}$"
13	157.6		187.0		210.1	
12	199.5	4 Ls 6" x 4" x $\frac{7}{16}$" 1 Pl. 12" x $\frac{7}{16}$"	242.9	4 Ls 6" x 4" x $\frac{3}{8}$" 1 Web 12" x $\frac{3}{8}$" 2 Covs. 14" x $\frac{5}{16}$"	238.6	4 Ls 6" x 4" x $\frac{3}{8}$" 1 Web 12" x $\frac{3}{8}$" 2 Covs. 14" x $\frac{5}{16}$"
11	240.8		289.1		276.9	
10	287.2	4 Ls 6" x 4" x $\frac{3}{8}$" 1 Web 12" x $\frac{3}{8}$" 2 Covs. 14" x $\frac{5}{16}$"	340.8	4 Ls 6" x 4" x $\frac{7}{16}$" 1 Web 12" x $\frac{7}{16}$" 2 Covs. 14" x $\frac{3}{8}$"	321.0	4 Ls 6" x 4" x $\frac{3}{8}$" 1 Web 12" x $\frac{3}{8}$" 2 Covs. 14" x $\frac{3}{8}$"
9	333.0		391.9		365.7	
8	378.3	4 Ls 6" x 4" x $\frac{7}{16}$" 1 Web 12" x $\frac{7}{16}$" 2 Covs. 14" x $\frac{7}{16}$"	442.4	4 Ls 6 x 4 x $\frac{1}{2}$ 1 Web 12 x $\frac{1}{2}$ 2 Covs. 14 x	409.6	4 Ls 6" x 4" x $\frac{1}{2}$" 1 Web 12" x $\frac{1}{2}$" 2 Covs. 14" x $\frac{7}{16}$"
7	426.8		496.5		455.4	
6	475.4	4 Ls 6" x 4" x $\frac{9}{16}$" 1 Web 12" x $\frac{1}{2}$" 2 Covs. 14" x $\frac{1}{2}$"	551.5	4 Ls 6" x 4" x $\frac{5}{8}$" 1 Web 12" x $\frac{1}{2}$" 2 Covs. 14" x $\frac{5}{8}$"	504.1	4 Ls 6" x 4" x $\frac{5}{8}$" 1 Web 12" x $\frac{1}{2}$" 2 Covs. 14" x $\frac{9}{16}$"
5	524.6		606.3		554.6	
4	573.8	4 Ls 6" x 4" x $\frac{11}{16}$" 1 Web 12" x $\frac{1}{2}$" 2 Covs. 14" x $\frac{5}{8}$"	661.1	4 Ls 6" x 4" x $\frac{11}{16}$" 1 Web 12" x $\frac{1}{2}$" 2 Covs. 14" x $\frac{7}{8}$"	605.1	4 Ls 6" x 4" x $\frac{11}{16}$" 1 Web 12" x $\frac{1}{2}$" 2 Covs. 14" x $\frac{11}{16}$"
3	623.0		715.9		655.6	
2	672.2	4 Ls 6" x 4" x $\frac{11}{16}$" 1 Web 12" x $\frac{11}{16}$" 2 Covs. 15" x $1\frac{5}{16}$"	777.6	4 Ls 6" x 4" x $\frac{11}{16}$" 1 Web 12" x $\frac{11}{16}$" 2 Covs. 14" x $1\frac{1}{8}$"	706.1	4 Ls 6" x 4" x $\frac{11}{16}$" 1 Web 12" x $\frac{11}{16}$" 2 Covs. 14" x $\frac{15}{16}$"
1	719.9		835.9		765.4	
1-B.	797.5	4 Ls 6" x 4" x $\frac{11}{16}$" 1 Web 12" x $\frac{11}{16}$" 2 Covs. 15" x $1\frac{5}{16}$"	920.1	4 Ls 6" x 4" x $\frac{11}{16}$" 1 Web 12" x $\frac{11}{16}$" 2 Covs. 14" x $1\frac{7}{16}$"	810.9	4 Ls 6" x 4" x $\frac{11}{16}$" 1 Web 12" x $\frac{11}{16}$" 2 Covs. 14" x $1\frac{1}{16}$"
2-B.	828.1		954.3		828.9	

GRILLAGE SCHEDULE

Col. No.	Load	Section	Col. No.	Load	Section
1	738.0	4 Is 15" x 55# x 5'-0"	19	944.1	5 Is 15" x 60# x 5'-0"
2	926.8	5 Is 15" x 55# x 4'-11"	20	1075.0	5 Is 15" x 70# x 5'-9"
3	828.6	5 Is 15" x 55# x 4'-5"	21	978.1	5 Is 15" x 60 x 5'-2"
4	999.8	5 Is 15" x 65# x 5'-4"	22	1002.9	5 Is 15" x 65# x 5'-4"
5	1105.4	5 Is 15" x 80# x 5'-11"	23	238.7	2 Is 10" x 35# x 3'-2"
6	767.4	4 Is 15" x 60# x 5'-1"	24	126.4	2 Is 10" x 30# x 2'-0"
7	1034.6	5 Is 15" x 70# x 5'-6"	25	937.6	5 Is 15" x 60# x 5'-0"
8	990.0	5 Is 15" x 65# x 5'-3"	26	986.0	5 Is 15" x 65# x 5'-3"
9	863.6	5 Is 15" x 55# x 4'-7"	27	892.9	5 Is 15" x 55# x 4'-9"
10	559.1	3 Is 15" x 55# x 5'-0"	28	1026.9	5 Is 15" x 70# x 5' x 6"
11	624.7	4 Is 15" x 55# x 4'-2"	29	976.9	5 Is 15" x 65# x 5'-2"
12	1147.1	5 Is 15" x 80# x 6'-1"	30	888.7	5 Is 15" x 55# x 4'-9"
13	1047.1	5 Is 15" x 70# x 5'-7"	31	722.3	4 Is 15" x 55# x 5'-1"
14	1120.7	5 Is 15" x 70# x 6'-0"	32	912.4	5 Is 15" x 55# x 4'-10"
15	996.6	5 Is 15" x 65 x 5'-4"	33	828.1	5 Is 15" x 55# x 4'-10"
16	1376.6	5 Is 20" x 95# x 7'-4"	34	828.1	5 Is 15" x 55# x 4'-10"
17	1113.1	5 Is 15" x 70# x 5'-11"	35	954.3	5 Is 15" x 60# x 5'-1"
18	887.7	5 Is 15" x 55# x 4'-9"	36	828.9	5 Is 15" x 55# x 4'-10"